things are red, stuff *alone* is water.

– *Willard Van Orman Quine*

University of Alberta

Stuff, Universals, and Things: some themes from metaphysics

by

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Abba,

Abba,

Abba,

Where are you?

Are you not there?

This work is dedicated to my Abba, my late father

Nurul Islam Chowdhury

I saw him last on 14 September, 2001 as he said "good-bye" to me;
I will never see him again.

Abstract

The problem which spurred this thesis has three components. First, there are entities which we may call stuff – alluded to by uncountable nouns; these entities seem to have a duality for behaving like both (i) an object or a discrete middle size substance – which are supposed to be non-repetitive and independent, and as well as (ii) a concept or a universal – which are repetitive but dependent (on some independent substances). Second, a dichotomy persists between the two aspects of the duality: what is non-repeatable cannot be repeatable and, conversely what is repeatable cannot be non-repeatable. Third, there is a background of how we conventionally do logic, and our present trend of doing – or rather, doing away with – metaphysics.

The thesis then came up with four chapters. Chapter 1 deals with the question – how can, or how do we deal with stuff predication following the conventional guidelines? – where by stuff predication I mean any predication involving stuff. I also tried there to find out some clues from Frege's works. Chapter 2 dives into some related issues pertaining to language, grammar and the notion of constitution. Chapter 3 examines critically two types of theories or views (one of them has been recently championed by Michael Dummett and P.F. Strawson; the other by David Armstrong) arguing how repetitive entities differ from the non-repetitive ones. My counter argument is that those arguments are either fallacious or not even complete. Chapter 4 takes an Aristotelian perspective following the lead of E.J. Lowe.

The thesis has a pessimistic tone at the end: the conventional method is quite inadequate as it misses some subtleties pertaining to stuff, nor could Lowe's Aristotle take us too far. Nevertheless, one cannot – I hope – miss some deeper insights glimpsing into this work. Particularly, Chapter 3 opens up some new venues to think about: our thoughts about our own arguments and proofs may need some revamping.

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I recall here with gratitude my older gurus: especially Jamal Nazrul Islam, who used to liken me to Iqbal's "shaheen", Gavin Charles Wraith, who opened my mind to logic and mathematics, and Ali Ahmed Mallick, Abdul Muhit, Abdul Khaleque, Luthfur Rahman and Badiur Rahman. And I cannot resist here thanking my friends Fahad and Nandini for all their supports and cheers.

I cannot stop thinking here of my parents, my parents-in-law, my grandparents, my friends, my cousins, my uncles, my daughters and my wife; they all have contributed to what I have achieved now, and my wife has burnt me all her life. Then there are – it comes to my mind – the wretched people of this Earth; they may be the suppressed tribes of Chittagong Hilltracts (Bangladesh), the poor Indian farmers who discovered the benefit of Neem plants, the Ethiopian farmers who used Pythagoras' theorems (long before the Pythagoras Brotherhood) to reclaim the inundated lands from the Nile, or the near extinct American Indians. There are also people like Gregor Mendel, Srinavasa Ramanujan, al-Biruni, Gottfried Leibnitz and so on. I am rooted to all these people, am only a trivial part of them; I am grateful to them all – all – for my existence, my ideas, my ideals and my dreams.

"Oh Lord make me bow down my head under the dust of your feet
Have all my pride submerged in my tears,

. . . .

Let me not trumpet myself in my own work
Let your wish be fulfilled through my life"

[from a song by *Rabindranath Tagore*]

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Prologue

This is a preview-cum-review of the present work. My problem began, as I would like to put it now, with one or two simple and naïve questions. What is stuff in the Fregean framework? Or, where can stuff fit into Frege's framework? My intention was, mainly, to probe some relevant metaphysical issues through these questions. But, of course, the questions were not as explicit as I put them now. Instead of "stuff" my mind was hovering then with the word "mass", traces of which may still linger here. It is, of course, not important to fish for an apt word – whether I should use "mass", "stuff", "matter", or something else. Maybe we can find some subtle differences among all these related words. But for the present purpose a more important feature is that all these words share a certain ambiguity by having two intertwined senses – which we may call the *partitive sense* and the *generic sense*.[1] For example in the phrases "the stuff this desk is made of " and "the matter of this desk" the words "stuff" or "matter" are used in the partitive sense. Whereas in the sentences "This stuff is lighter than that stuff" or "Hydrogen is lighter than oxygen" the words "stuff", "hydrogen" and "oxygen" are said to be used in the generic sense. Both the senses are equally apparent in the present work, though my deeper concern seems to lie more with the partitive sense.

The question is now, What do I mean by the adverbial "in the Fregean background"? What exactly do I mean by either "Fregean framework" or "Frege's framework"? I must limn it out with some details. By "Fregean framework" I wanted to mean certain practice or certain way of thinking. As a first step I can describe it to be the very way we do logic nowadays – predicate logic along with quantification. This is a tradition we have inherited from Frege. It is not necessary that everything we do now under the banner of predicate logic should be traceable in Frege's original works. But it is well known that through his concept-scripts Frege gave birth to quantification. Along with that he drew a distinction between –

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[1] I take this distinction from Link (1998).

what he called – subsumption and subordination. I take this distinction to be no less important than Frege's invention of quantification; in fact quantification and this distinction go hand in hand in predicate logic. If I say "Frege is a man" then that is a case of subsumption, whereas if I say "Man is a mammal" then that is a case of subordination. Usually, the latter, but not the former, is paraphrased into "Whatever is a man is also a mammal". In Chapter 1[2] I take some space dwelling on this distinction, which will be presumed in the subsequent chapters. The distinction, let me add, is not limned under the single rubric of "predication", and it is deeply inculcated into our logic education. In the same chapter I became a little suspicious that the distinction becomes counter productive when it nears to stuff-predication, by which I roughly mean a predication that *involves* stuff – in some primary sense of involvement. My suspicion then lingers in the next chapter, Chapter 2.

It will be not very accurate if by Fregean framework I strictly mean a certain convention in logic. In fact that seems to be less important from a metaphysical point of view. Rather, the Fregean background, as I see it now, is an ethos or an ideology associated with certain methodology. In its preliminary formulation the methodology says that we can assay ontology by *examining the syntax of an ideal language.*[3] The ideal language can be our familiar first order predicate logic or it can be Frege's concept-scripts (which, I assume, is not confined into first order quantification). But I would rather reformulate the ethos in more general terms. It says, as I would like to put it now, that we can assay an ontology by examining or constructing or finding any of the following:

(i) the structure/syntax of certain ideal representational system.

---

[2] This is regarding how I arrange and refer the various chapters and sections of this essay. I have tried to index those sections and chapters in a lexiographic order reflected in the contents (see the contents page). As it is evident, by "Ch 3.1.2" I shall mean the section (or chapter or subsection) corresponding to the string "3.1.2"; more specifically Ch 3.1.2 refers the 2nd subsection of the 1st section of the 3rd chapter. I shall use the prefix "Ch" followed by a blank space when I resort to that way of referring. But I shall keep the liberty of referring more loosely; so, for example I may write "Chapter 1" instead of "Ch 1".

[3] Smith, Barry (2005) names this ethos "fantology".

(ii) an invariant structure – mainly, in the form of some kind of homomorphism – across the structures/syntaxes of certain representational system(s).

Here by a representational system I mean a language or a theory (or – may be – even a text), which is supposed to – at least in its initial sense – describe or represent an underlying reality.

Now this ethos has a minimizing effect on ontology, saying that there are either few ontological categories or no genuine – in the sense of something beyond representation – ontological categories at all. So for example Frege could say that there are only two ontological categories, objects and concepts.[4] And in the extreme case a philosopher of science,[5] swayed by this ethos, can claim that there is nothing beyond what we know through structures. I also take the notion of bare objects as another kind of minimizing effect over ontology. It will be a misnomer to call it "Fregean framework" any longer, for it seems that the historical Frege showed some resistance toward this ethos too. Better, let us call it "*linguistism*".[6] My general problem is while I cannot accept this ethos I cannot find a very convincing alternative to it either. So sometimes I try to be a believer (traces of it can be found in Ch 1.2 and Ch 1.3), sometimes a vehement critic (mainly by turning against Strawson's proposed criteria for distinguishing a particular from universal in Ch 3.1.2) and sometimes I look for a new camp (in Ch 4).

There is also another important view, which I shall simply call *the dichotomy*. In a nut shell the view says that there are dichotomous pairs, described loosely in various guises: particulars versus universals, objects versus concepts, non-repeatables versus repeatables and so on. Previously, I used to call it the Fregean dichotomy – assuming that Frege deserves some credit for this. I realize now that my assumption was wrong; the dichotomy is as old as the problem of universals, which has been a perennial problem in the history of philosophy – of both East and West – long before Frege. Nevertheless, Frege has his own assay in this regard and I may still retain my old habit of saying "Fregean dichotomy". I shall have more on this later.

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[4] I can think of Armstrong (2005) as an exemplary of this view.

[5] I can think of Ladyman, James (1998) as an exemplary of this view.

[6] I borrow the word "linguisticism" from Martin, C. B. and Heil, John (1999)

If I have to be more specific now I would like to put my problem like this. There are, at the outset, three components: the *dichotomy*, *linguisticism*, and *stuff*. I take a realist stance with respect to the dichotomy – believing that the dichotomy as well as its polarized components are more or less real, that is to say I cannot dispense with any of those dichotomized components (at the cost of the other). I also nurture and struggle with certain intuitions, which turn out to be related with the partitive sense of stuff.[7] It seems to me now that these intuitions, let us call them primitive intuitions, are either lost or cannot be captured in linguisticism.

What I have just described is how I see the problem now. That can be at best a justification of my present work. But a justification is not the actual history of an action. While working on this thesis I saw the problems a little differently. This might be because I used to see the dichotomy as a part of "the Fregean framework". Furthermore my realist stance regarding the dichotomy was not as explicit as it is now. However, I was somehow – though not very clearly – aware of the minimizing effect of linguisticism. One natural question was then: How well justified is the dichotomy? This question eventually gave birth to Chapter 3. The answer, of course, turned up to be negative: the justifications provided by the linguisticism are too faulty.

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[7] These intuitions, as I find them, are very elusive, but yet they have been working in me like hidden variables. I could spell them out only – and may be not yet completely – at the end of the day, in the epilogue. So far I find, or I can explicate, three such intuitions. First stuff is a kind of carrier/bearer of thisness or particularity and as well as of identity. Secondly, stuff has a mathematical feature. Third, stuff has a sense of exhaustiveness.

Well we may just accept the dichotomy – that there is a pair of ontological categories, universals and particulars, or concepts and objects – as an axiomatic truth. No longer do we need to worry about the justifications then. But how about the pairing itself? Why does an entity from one of those categories pair with an entity of the other category? In other words, How does a particular *instantiate* a universal? Or conversely, How can it happen that a universal is manifested in (that is to say it is instantiated by) a particular? These are, of course, questions regarding predication. Though they are interesting there seems to be a more basic question: Can we have a significant classification of these various pairings? I seem to have got some positive answer to that question from Lowe. That is what Chapter 4 is about. Lowe has also some answers, though not very explicitly, to my other questions. Stuff in generic sense, says Lowe, must be a substance. Thus to some extent the chapter has to dwell on the notion of substance. Lowe also coined a word called "quantity", which has a close bearing on one of my primitive intuitions. I count Lowe as someone beyond the camp of linguisticism, and the notion of substances in classical sense – which Lowe upholds – has no place in linguisticism.

Should it be "stuff" or "stuffs"? How can I say "a stuff"? These are some grammatical questions I could not avoid bringing under close scrutiny. Chapter 2 begins with these questions. The chapter has to deal with other relevant questions. Stuff is often claimed to be a hybrid, defying the dualism between particulars and universals. But, how? And, how far is it true? Ch 2.2 and Ch 2.3 try to address these questions. Semantics along with set theory has been a paradigmatic tool for probing ontology. But the tool, I suspect, might become too blunt for inquiring into certain issues pertaining to stuff. Ch 2.4 is a demonstration of that. Rather a more direct linguistic approach, as I show it in section Ch 2.5, might be more fruitful. But, how about mereology – the part-whole relation? In that case, I would say, we need a much wider notion of mereology – which I haven't found yet. Nevertheless, in Ch 2.6, I tinkered with a mereological idea. Though I couldn't use the result further here, it might be – I hope – useful on some other occasions.

As I have alluded earlier, Frege is not alone in seeing the dichotomy – between a particular and a universal, between an object and a concept, between a non-repeatable and a repeatables, and so on. Nevertheless, he has his own words about the dichotomy. He insists that there is a distinction between objects and concepts, which he likened to functions and arguments respectively. He uses the metaphors of "complete" versus "incomplete", or "saturated" versus "unsaturated – saying concepts are "incomplete" or "unsaturated" while objects are "complete" or "saturated". Furthermore he brings in the distinction between higher order concepts and lower order concepts. An object can fall under a concept giving us a true thought, otherwise we will have a false thought. In a like manner a lower order concept can fall under a higher order concept. Frege implies that the distinction between an object and a concept is exhaustive – in the sense the any entity is either an object or a concept. He says that the two different categories are fundamentally different and an object's falling under concept is a fundamental relation of logic. What does Frege mean by "fundamental" or "fundamentally"? Is there a univocal answer to that? That seems to be more a matter of scholarly investigation, which is beyond the scope of the present essay. Nevertheless, I would like to suggest here that one answer might be: the two categories are also mutually – or rather more precisely, *jointly* – exhaustive. But that is not a too satisfactory answer. For though it may answer why the two categories are said to be distinct, exhaustiveness seems to provide no clue as to the question why falling under is considered to be a fundamental relation in logic. For the latter question we may get more clues from Frege's metaphors of "complete" versus "incomplete" or "saturated" versus "unsaturated". The idea seems to be this: by having these two different natures – as alluded to by the metaphors – we can explain how thoughts are unified, or how different components of a proposition can be fused into a single seamless whole. This is actually a response to Bradley's regress argument which is as follows. Suppose there is a relation R which relates, say two relata *a* and *b*. But to relate R to *a* and *b* we should need a third item say R_1 that would relate R, *a* and *b*. Thus begins a regress. For we can argue similarly for a fourth item relating R_1, R, *a* and *b*; and so on. In future we may need at least this much familiarity with Bradley's regress. [8]

Lastly, some conventions. I shall often use all capital letters in order to mean that there is a relevant universal or a concept (to use Frege's terminology). Thus LOVE is a (relation) universal. We normally take it to be a binary relation. I shall distinguish a *relation* from a *relationship*, though sometimes I may not be that careful. We need this distinction in order to avoid Bradley's regress. A relationship might be explicitly called a *formal ontological relation/relationship*.[9] For example when Frege says that an object falls under a concept the *falling under* is a relationship or a formal ontological relation; it is quite different from the relation LOVE. LOVE can be taken to be, if we are a realist, a genuine item of reality but falling under is not an item like that; the latter might become only essential when we talk about reality.[10]

---

[8] For Bradley's regress I find these writing to be very helpful : Russell (1910), Russell, (1943, Ch. XXVI) and Mertz, D.W. (1966)

[9] I take this terminology from Lowe(2006 a).

[10] Often a distinction is drawn between an internal relation and an external relation. What I call relationship might be called a case of internal relations, and by the same token a relation – in my terminology – is an external relation. But I am not sure whether my distinction between a relationship and a relation exactly coalesce with internal/external distinction. The former distinction is meant for ontological terms like "instantiation" and "constitution". The distinction internal vs. external, I suspect, extends beyond the domain of ontology.

Chapter 1

From Frege's Ashes

1.1 Finding a Distinction

I begin with Frege.[11] He tries to sort out some special concepts bearing certain marks (Merkmale).[12] He also invented this technical notion, that a concept can *bear* a mark. It seems that a normal concept bearing those marks is such that there is a unique number – which is the number of the objects falling under the very concept. In other words, such a concept is associated with a number – which is most likely unique – and very likely it is a finite number. Like Frege but at the same time opposing him I am also thinking of certain concepts, which seems to be quite the converse of what Frege was looking for. Loosely speaking, these converse concepts can be called stuff concepts which are closely linked with what we variously call stuff, matter or mass. By calling them concepts one may feel a little ill at ease. Are not stuff concepts stuffs too? Are not stuffs,[13] unlike concepts, and more so if the concepts are Fregean, concrete – occupying space and time? Even using Fregean metaphors of "incomplete" or "unsaturated" we do not find them as incomplete or unsaturated and hence they should not be counted as concepts. Rather, using this test, they should be objects, and incidentally we find an occasion when Frege cited them as examples of objects.[14] But, yet quite often we treat them as concepts rather than Fregean objects. This becomes manifest when we tend to analyze a sentence like "*Butter is milk*" in the same format of "*Mammoths are mammals*" and avoid the format of "*Mammoths are extinct*" or "*Manfred is a mammoth*". Our preference for the former format means that neither butter nor milk can be treated as a Fregean object. According to §53 (of *Grundlagen*), this would mean that the concept "milk" is a mark of the concept "butter". But we shouldn't say that the concept "butter" falls under the concept "milk".

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[11] The main reference for this chapter is **Die Grundlagen Arithmetik: Eine Logisch-Mathematische Untersuchung über Den Begriff der Zahl** [Frege, G. (1884a)], which is often simply referred as "*Grundlagen*". There are two English translations of *Grundlagen*: the standard one is by J.L. Austin [Frege, G. (1884b)], and the other one is by Dale Jacquette [Frege, G. (2006)]. I shall mostly use the standard translation here.

[12] In particular, §54 of *Grundlagen* discusses about these especial concepts.

[13] Readers might be offended by my usage of "stuffs" instead of "stuff" – that goes against English Grammar. There will be more similar breaches in the sequel. The next chapter, I hope, will justify this practice of my breaching the Law.

It is well known, or at least a popular tacit assumption, that Frege maintained a strict division between a concept and an object – that no object can be a concept. According to Frege an object, falls under a concept. He took this falling under relationship as the fundamental relation in logic – calling it "*subsumption*". In our familiar parlance we may just call it predication. Subsumption, Frege insisted, should be distinguished from *subordination.*[15] The

---

[14] At the beginning of *Begrffsschrift* §9 Frege supposes that the "circumstance that hydrogen is lighter than carbon dioxide" is expressed his formula language. His point is that the circumstance can expressed either as *(hydrogen) is lighter than carbon dioxide* or as *hydrogen is lighter than (carbon dioxide)*. Referring to the former case he writes

> ... 'hydrogen' was the argument and 'being lighter than carbon dioxide' is the function.

Now an argument is another name for Frege. I therefore take this instance of Frege's taking a mass-expression as an object.

[15] See Angelleli, Ignacio (2004) for this distinction – between subsumption and subordination.

I don't know what exactly Frege originally called them in German for the terms "subsumption" and "subordination". These two terms were coined by Hans Hermes *et al* as they edit and translate **Gottlob Frege, Posthumous Writings** , in particular Frege (1906) *On Schoenfliess: Die Logischen Paradoxien der Mengenlehre*. I shall follow their (Hans Hermes *et al*) coinage throughout this work.

In academic parlance – also in philosophy – subsumption usually means: "... bringing of a concept, cognition, etc. *under* a general term or a larger or higher concept, etc. ... " (according to latter is the very relation we find in "*Mammoths are mammals*" – when a class (the class of mammals) contains another class (the class of mammoths) as a subclass of the former class. As for subsumption we can cite the examples of "*Manfred is a mammoth*" and "*Mammoths are extinct*". In the former example an object named as "*Manfred*" falls under the concept " ... *is a mammoth*". In the latter example the concept "*Mammoths*", or more accurately the concept " ...*are mammoths*" falls under another concept "...*are extinct*". It turns now that a concept has both the options – either something can fall under it or it can fall under another higher-order concept. This symmetry breaks down in case of an object, which can only fall under a concept but nothing can fall under it. We can say, in terms of this presentation, that concepts are symmetric beings whereas objects are asymmetric beings.[16] Frege, of course, put it in a different way – saying that concepts are incomplete or unsaturated and objects are saturated or complete. When it is claimed that no objects are concepts it means that we cannot have any being showing both the symmetric and asymmetric nature – if it is symmetric it cannot be asymmetric and if it asymmetric it cannot be symmetric. It is added further that there cannot be any being which is neither concept nor object.[17] I shall refer to this situation as the concept/object dichotomy (or divide, division and so on) suggesting that there is an exhaustive and mutually exclusive division between concepts and objects.

Let us take a pause here. So far we have alluded to two different distinctions. One is between subsumption and subordination and the other is between a concept and an object. Frege can be credited for the former distinction but not for the latter. This latter distinction seems to be a perennial philosophical

---

Oxford English Dictionary). In other words "If A subsumes B, then A is higher level of generality than B."(Rosenkrantz, Gary and Hoffman, Joshua p. 840). This normal usage is rather more generic – covering also Frege's "subordination". But, let us remember, Frege' s "subsumption" – as it is translated by Hans Hermes *et al* – is more specific than the normal usage.

[16] Or we can think concepts are beings with two arrows, a downward arrow and an upward arrow; whereas objects are beings with only an upward arrow. An arrow from A to B means that A falls under B (or B subsumes A).

obsession, which can be traced back to ancient Greek philosophy. And this will be a persistent obsession – sometimes explicitly and sometimes implicitly – of my present thesis. This will be coupled with another, hardly less, obsession. What is stuff? This question has some inkling with Frege's other distinction, between subsumption and subordination. Let us, then, go through the distinction with some details.

1.2 Application in Logic

The distinction between a mark and a property and thereby the distinction between subordination and subsumption is closely tied up with Frege's invention, his theory of quantification – with which we are so familiar. If concept ***A*** is a mark of concept ***B*** that is, then, said to be a case of subordination. This we write $\boldsymbol{A}\supset\boldsymbol{B}$ – in sets. We can also express it using quantification; hence we can write – "Whatever is ***B*** is also an ***A***" or "All ***B***s are ***A***s" or $(\forall x)\ [\boldsymbol{B}(x)\Rightarrow\boldsymbol{A}(x)]$. If ***A*** is a property of ***B*** then set theoretically we can represent it by $\boldsymbol{B}\in\boldsymbol{A}$. Quantification theory is needed for subordination not for subsumption but at the same time we should not forget that along with quantifiers we also need subsumption. And, here I like to point out a fault of (Fregean) quantification theory.[18] Suppose we want to say that "*Butter is milk*" and our standard formulation is in terms of subordination, that milk is a mark of butter and we write $(\forall x)\ [\boldsymbol{Butter}(x)\Rightarrow\boldsymbol{Milk}(x)]$, or informally

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[17] This follows from Frege's saying:

> "An object is anything that is not a function"
>
> [p. 32 of Frege, G. (1891) and **P**. 18 (of original pagination)]

Following this quote we can take functions or concepts as the primitives and objects can be defined by those primitives.

[18] I am pointing out this default here incidentally; this will not be discussed in the sequel.

"Whatever is butter is milk". The problem is – that by default the quantification theory requires that the range of the variable "x"(or the pronoun "whatever") should range over a discrete domain and there cannot be a non-discrete domain.[19] Hence, being not treatable by quantification in a straightforward manner, stuff concepts as well as stuffs become some sort of dark beings or, worse, pseudo-beings.

Frege brought the distinction along with a warning, that we should not conflate an attribute of a concept with a concept of a concept. He says,

> By properties which are asserted of a concept I naturally do not mean the characteristics which make up the concept. These latter are properties of the things which fall under the concept, not of the concept. Thus "rectangular" is not a property of the concept "rectangular triangle"; but the proposition that there exists no rectangular equilateral rectilinear triangle does state a property of the concept "rectangular equilateral rectilinear triangle"; it assigns to it number nought. [20]

So a number is a concept of a concept. But that is not the case with an attribute, which is rather a "mark", or a "characteristic", or – still better – a "component characteristic" of a concept. Since they are components of a concept the marks can also be taken as concepts; thereby the given concept can be constructed out of these components. So the concept "... is a rectangular triangle" is composed of the concept "... is rectangular" and the concept "... is a triangle". Or the concept "... is black silken cloth" can be taken as a conjunction of all the marks, "...is black", "...is silken" and "... is cloth".[21] In terms of λ-notation what all these mean is that

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[19] Therefore we can hear Quine's slogan "To be is to be value of a variable" and there is a further assumption, that the variable should range over discrete items.

[20] *Grundlagen* p.64

[21] Frege also writes, (but I have lost the references, maybe in one his correspondences,) "Concepts are generally composed of component concepts: the characteristics. *Black silken cloth* has the characteristics *black*, *silken*, and *cloth*. An object falling under this concept has the characteristics as its properties. What is a characteristic with respect to concept is property of an object falling under that concept."

$\lambda x.\ [x \textit{ is black silken cloth}]$ can be defined as

$\lambda x.[x \textit{ is black } \& \ x \textit{ is silken } \& \ x \textit{ is cloth}]$. We can apply the function

$\lambda y.[\textit{the number of objects falling under } y]$ over ($\lambda x.[x \textit{ is black silken cloth}]$) so that

$\lambda y.[\textit{the number of objects falling under } y]$ ($\lambda x.[x \textit{ is black silken cloth}]$)

But we cannot go for the following predications,

$\lambda y.[\ y \textit{ is black}]$ ($\lambda x.[x \textit{ is black silken cloth}]$)

$\lambda y.[\ y \textit{ is silken}]$ ($\lambda x.[x \textit{ is black silken cloth}]$)

$\lambda y.[\ y \textit{ is cloth}]$($\lambda x.[x \textit{ is black silken cloth}]$)

To put the matter more simply suppose **C** is a concept having the marks $\mathbf{M}_1$, $\mathbf{M}_2$ and $\mathbf{M}_3$. $\mathbf{C}(x)$ is then equivalent to $\mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)$, i.e. $\mathbf{C} = \mathbf{M}_1\&\mathbf{M}_2\&\mathbf{M}_3$.[22] We then get all the conditionals,

$(\forall x)\ [\mathbf{C}(x) \Rightarrow \mathbf{M}_1(x)]$, $(\forall x)\ [\mathbf{C}(x) \Rightarrow \mathbf{M}_2(x)]$ and $\forall(x)\ [\mathbf{C}(x) \Rightarrow \mathbf{M}_3(x)]$.

It will be fallacious if we take those marks as properties of **C**, i.e. as $\mathbf{M}_1(\mathbf{C})$, $\mathbf{M}_2(\mathbf{C})$, or $\mathbf{M}_3(\mathbf{C})$ parallel to the (second order) predication [*the number of objects falling under*](**C**). It is important to note Frege's careful articulation in the above excerpt: that "properties ... *are asserted of* a concept", whereas "characteristics *make up* the concept". We slip over the fallacy if we take any characteristic's making up a concept as predicating the concept by the characteristic. And the fallacy happens because of our imprecise natural languages. Thus a loose expression like "the attributes of a concept" may tempt us to take it as saying that "the attributes which are predicated over a concept" rather than the correct saying that "the attributes which make up a concept"

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[22] It is intuitively evident that $\mathbf{C}(x) = \mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)$ can be written into $\mathbf{C} = \mathbf{M}_1\&\mathbf{M}_2\ \&\mathbf{M}_3$. The latter expression is in variable free notation, which becomes quite an effective tool in combinatorics. In the sequel I shall often go for variable free notation relying on readers' intuition. We will have more on notation later.

Take this argument in English.

(E)(1) *socrates is a man, Man is rational / ∴ socrates is rational*

In terms of our familiar Fregean notation we parse the argument as follows

(F)(1f) MAN(***socrates***), ∀(*x*)[MAN(*x*) ⇒RATIONAL(*x*)]

/ ∴ RATIONAL(***socrates***)

Let us call this way of paraphrasing Fregean-parsing. The structure of (F) is a little different from (E) and the difference lies mainly in the second premise. If we follow the structure of English then (E) could be parsed as follows instead

(A)(1n) MAN(***socrates***), RATIONAL(MAN) / ∴ RATIONAL(***socrates***)

Let us name this way of paraphrasing Natural-parsing. The inference in (A) depends on two assumptions,

assumption (1):

> that there is a predication of the RATIONAL over the concept (or universal) MAN, hence RATIONAL is a property of the concept MAN.

assumption (2):

> that predication is a transitive relation, so that from ***A***(***B***) and ***B***(***C***) follows ***A***(***C***).

Both these assumptions may breed certain absurdities. For example it is quite absurd to accept that the universal or the concept MAN is rational, but that is what assumption (1) makes us believe. Consider the following argument

(T)(2) *socrates is a man, Man is difficult to define / ∴ socrates is difficult to define*

In terms of Natural parsing (T) becomes

(T-N)(2n)

MAN(***socrates***), DIFFICULT-TO-DEFINE(MAN)

/ ∴ DIFFICULT-TO-DEFINE (***socrates***)

The absurdity is evident in the conclusion, which we could draw because of our assuming that DIFFICULT-TO-DEFINE is a predicate of MAN [assumption (1)], and that predication is a transitive relation [assumption (2)]. But while we can accept assumption(1) here – since it is possible that DIFFICULT-TO-DEFINE(MAN) is true we cannot accept DIFFICULT-TO-DEFINE(***socrates***). Intuitively, we can see that there a fallacy, if we conclude DIFFICULT-TO-DEFINE (***socrates***) in (2n). We can call it the *fallacy of predicate transitivity*.

Let us remember this. What normally appears to be the form of $\boldsymbol{B}(\boldsymbol{C})$, where ***B*** and ***C*** are, should be rather paraphrased as $(\forall x)[\boldsymbol{C}(x)\Rightarrow\boldsymbol{B}(x)]$ or – more informally – "(all) ***C****s* are ***B***s" . *B* is called a mark of ***C*** or we say ***B*** is an attribute/ characteristic making up ***C***. This very relation between C and B is a case subordination; it should be kept distinct from *subsumption* – which is the relationship of an object's falling under a concept.[23]

In the light of the foregoing discussion I would like to innovate some notation. Recall that by $\mathbf{C} \equiv \mathbf{M}_1\&\mathbf{M}_2\&\mathbf{M}_3$ I wanted to mean that the attributes $\mathbf{M}_1$, $\mathbf{M}_2$ and $\mathbf{M}_3$ make up the concept **C**. $\mathbf{C} \equiv \mathbf{M}_1\&\mathbf{M}_2\&\mathbf{M}_3$ then abbreviates $\mathbf{C}(x) \equiv \mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)$. There is also a further assumption: these marks – $\mathbf{M}_1$, $\mathbf{M}_2$ and $\mathbf{M}_3$ – are the only marks making up **C**. If $\mathbf{M}_1$, $\mathbf{M}_2$ and $\mathbf{M}_3$ are marks of **C**, then by the Fregean analysis of subordination, we get $(\forall x)\,[\mathbf{C}(x)\Rightarrow\mathbf{M}_1(x)]$, $(\forall x)\,[\mathbf{C}(x)\Rightarrow\mathbf{M}_2(x)]$ and $(\forall x)[\mathbf{C}(x)\Rightarrow\mathbf{M}_3(x)]$; this means $(\forall x)\,[\mathbf{C}(x)\Rightarrow\mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)]$. As **C** is assumed to be made up only by those marks we eventually get $(\forall x)\,[\mathbf{C}(x)\equiv\mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)]$. In order to keep the distinction between subsumption and subordination I suggest to write $\mathbf{M}_1{}^{=}\mathrm{C}$ so that we do not confuse it with $\mathbf{M}_1(\mathbf{C})$, which could wrongly suggest a subsumption relation instead of a subordination. And moreover $\mathbf{M}_1{}^{=}(\mathbf{C})$

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[23] At the end of *Grundlagen* §53 Frege thus writes,

> ...a concept can fall under a higher one, that is to say, a concept of second order. But this relationship is not to be confused with that of subordination. [p. 65]

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abbreviates$(\forall x)[\mathbf{C}(x)\Rightarrow\mathbf{M}_1(x)]$. We can have compound subordination like $\mathbf{M}_1\&\mathbf{M}_2\&\mathbf{M}_3{}^{\Leftarrow}(\mathbf{C})$, which means $(\forall x)[\mathbf{C}(x) \Rightarrow \mathbf{M}_1(x)\&\mathbf{M}_2(x)\&\mathbf{M}_3(x)]$.

Parallelly, I shall abbreviate compound existential statements of the form $(\exists x)\ [\mathbf{C}(x)\&\mathbf{M}(x)]$ into $\mathbf{C}^{\&}\mathbf{M}$. The relation between **C** and **M** is then neither a *subsumption* nor a *subordination*. A name is needed for this novel relation and I suggest to call it *coordination* of **C** and **M**.

This new symbolization-cum-abbreviation will not be complete without some examples. For subsumption we can take the sentence "Whales are mammals", which we will write as ***Mammal***$^{\Leftarrow}$***Whale***, just abbreviating $(\forall x)$ [***Whale***$(x)\Rightarrow$***Mammal***(x)]. As for coordination we may cite the usual example "There is a red pen", which is usually transcribed as $(\exists x)$ [***Red***$(x)\&$***Pen***(x)]. In terms of my present notation it will then become ***Red***$^{\&}$***Pen***.[24]

The distinction between subsumption and subordination can be expressed then as $\lambda P,Q.P(Q)$ and $\lambda P,Q.P^{\Leftarrow}Q$ respectively. When it is claimed that $P^{\Leftarrow}Q$ or $(\forall x)[Q(x)\Rightarrow P(x)]$ is a subordination in contradistinction to subsumption all it means is that there is a relation between the concepts P and Q and this very relation is distinct from the subsumption $P(Q)$. But we have to be careful about a certain subtlety. We should note first that the very formulation $(\forall x)\ [Q(x)\Rightarrow P(x)]$, which is a generalized sentence, is a subsumption between the higher order concept $(\forall x)\_$ and the concept $\lambda x.[Q(x)\Rightarrow P(x)]$. The latter concept is a complex concept constructed out from relatively simpler concepts. So though subordination is different from subsumption it is defined in terms of concepts and subsumption. Likewise, in $C^{\&}M$ or $(\exists x)\ [C(x)\&M(x)]$ we have the concept $\lambda x.\ [C(x)\&M(x)]$ falling under the higher order concept $(\exists x)\_$. In general in a generalized sentence a certain concept, which can be a complex concept in turn, falls under a higher order concept in the form of a quantifier. In the very generalization one may discern concept relations like subordination and coordination. Though these concept-relations appear to be distinct from subsumption they call for subsumption in the final analysis. Subsumption is thus a fundamental notion, we define other relation in terms of subsumption.

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[24] **But I like to relax some assumptions behind our conventional symbolization (which must have evolved from Frege's concept script). First I don't want to restrict the formulation *Red*$^{\&}$*Pen* only to mean a sentence like "There is a red pen". I like to see the formulation as capable of representing a noun phrase like "a red pen" in a sentence like "I want a red pen". Thus a semi formal symbolization of the latter sentence will be "I want a *Red*$^{\&}$*Pen*".**

1.3 Stuff-ing

So far we have seen that the Fregean parsing of subordination is a slightly complicated matter – at least it is not as simple as subsumption. Nevertheless, subsumption is a necessary condition of subordination, and the latter notion calls for some more tools, viz. quantifiers and truth-functionals. How far can all this go? Can we apply this Fregean approach with regard to stuffs?

Let us state or rather restate our problem in the present setting. We can explicate the following assumptions or constraints.

i) that there is a dichotomy

ii) that there is stuff or we have stuff concepts, and along with that stuff-predication

iii) that there is certain standard way of treating stuff-predication, and that involves the Fregean distinction between subsumption and subordination, which in turn presumes a certain amount of quantification and set theory.

iv) our intuitions

v) both ii) and iii) somehow assume i).

The problem is, very roughly, we cannot maintain all of them.

To begin with let us take the example, "Butter is milk". If I say "*Butter is milk*" then (following iii)) we have to formulate it as saying that "whatever is butter is milk"; so "butter" along with "milk" behave like concepts. If I consider now the sentences "*Butter is white*" and "*Milk is white*" then I am inclined (by iv)) to take "*Butter*" and "*Milk*" as objects just like the eluded white object in "*Mary's little lamb is white*". Therefore, "*Butter*" and "*Milk*" shows (violating i)) the double nature of being both object and concept, complete and incomplete.[25]

Take another sentence "The ball is made of iron". If it is true then we may say, using our intuition, that it is a case of stuff predication involving a stuff-concept. We may take the expressions "...is made of iron" or "... is a piece of iron" as embodiments of that stuff-concepts.

Consider the following argument involving stuff predication,

(5) *This book is made of paper, Paper is made of wood. / ∴ This book is made of wood.*

We take both the premises and the conclusion of this argument as showing subsumption and we may formulate the argument in terms of Fregean notation,

(5f) **Paper(this book)**, (∀*x*)[**Paper**(*x*) ⇒**Wood**(*x*)]/ ∴ **Wood(this book)**

We are quite fine with such formulation and we may feel no hitch there. But consider the Natural-parsing of (5).

(5n) **Paper(this book), Wood(Paper) / ∴ Wood(this book)**[26]

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[25] But why cannot I say that the concept milk is a higher order concept under which falls the concept "butter"? I think if we do so, disregarding our intuition, we will destroy some nicety of the vertical order of concepts: each concept has to have certain fixed level, either it is 1st order, 2nd order, and so on. If we take "*Butter is milk*" as subsumption of two concepts then the concepts will no more remain at a fixed unique level. But it is not known to me whether Frege demands such nicety.

[26] I am not taking, at least right now, constitution – like in "the ball is made of iron" or

The case with ***Wood*(*Paper*)** is a little different from the case of ***Rational*(*Man*)** of (A)(1n)[MAN(***socrates***), RATIONAL(MAN) / ∴ RATIONAL(***socrates***)]. In the latter case our objection was that ***Man*** (the concept) itself cannot be ***Rational*** rather, in terms of Fregean analysis, it is one whoever is man is rational. As for ***Wood*(*Paper*)** we are not willing to insist that ***Paper*** has to be a concept and as such the argument we brought against ***Rational*(*Man*)** becomes weaker here. One reason for our unwillingness to insist that ***Paper*** is a concept in ***Wood*(*Paper*)** seems to be that ***Paper***, as Quine[1960, §19, §20, p.91, p.97] noted for any mass term, has the dual nature of both being a concept and object. But accepting ***Paper*** as having the dual nature of both being object and concept means that we violate Frege's basic principle-that there is a fundamental distinction between an object and a concept – no object can be a concept.

Let us spend a little more time on this issue. Consider the sentence "***Paper*** is ***wood***". ***Paper*** can be, if we like to maintain the dichotomy, concept or an object but not both. If it is a concept then the sentence should be analyzed as $(\forall x)$ [***Paper***$(x) \Rightarrow$***Wood***(x)], for we don't take ***Wood*** to be a higher order concept under which falls the concept ***Paper***. If ***Paper*** is an object then we can take ***Wood*(*Paper*)** as a case of subsumption (or predication). Assuming the dichotomy we can go for only one analysis either $(\forall x)$[***Paper***$(x) \Rightarrow$***Wood***(x)] or ***Wood*(*Paper*)** but not both. Is it possible to have both the analyses together? If such a case is plausible, even it is partially plausible then that will greatly weaken Fregean thesis on concept/object dichotomy.

Imagine now a possible world where whatever is (made of) ***Paper*** is also (made of) ***Wood***, i.e. if one of the ingredients is ***Paper*** then ***Wood*** will be another ingredient too (like certain Japanese houses). This possible world will then satisfy $(\forall x)$[***Paper***$(x) \Rightarrow$***Wood***(x)]. But the assertion "*Paper is made of wood*" has a

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"The book is made of paper" – as something different from the paradigmatic predication – like "The ball is round" or "The rose is red". There will be some discussions about constitution in the next chapter, particularly in Ch 2.2 and Ch 2.6.

stronger claim, which intuitively means that the paper stuff *itself* is made of the wood stuff. One may, however, defend the Fregean analysis by making the domain of quantifiers more fine grained, so that the variable x ranges over any arbitrary parts of anything. The defender may then claim that what $(\forall x)[\boldsymbol{Paper}(x) \Rightarrow \boldsymbol{Wood}(x)]$ actually means is that if any x is (made of) ***Paper***, and however small arbitrary part x may be x is also (made of) ***Wood***. But such refinement may still fail to capture what ***Wood*(*Paper*)** asserts. As a model (of the suggested refinement) take all the subintervals, which can be closed or open, of the interval [0,1]. Take the left half of each subinterval as (made of) ***wood*** and the right-half as (made of) ***Paper***. This model, which we may call half-half model, will then satisfy $(\forall x)$ $[\boldsymbol{Paper}(x) \Rightarrow \boldsymbol{Wood}(x)]$. Each interval in the half-half model is paper as well as wood, thus whatever is paper is also wood. Though it nicely preserves the Fregean technique this kind of model fails to capture our original intuition, that the paper stuff *itself* is made of the wood stuff. Models often have too many artificial aspects, and it seems that they are not a very helpful tool for deciding certain deep philosophical issues, in particular with the issues pertaining to stuff.[27]

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[27] A better model for capturing our original intuition about ***Wood*(*Paper*)** can be as follows. Take two sets T and M, which are intuitively the sets of things and different stuffs respectively. There is a relation $\beta \subseteq T \times M$ so that $<t,m> \in \beta$ intuitively means that the thing $t \in T$ is constituted by $m \in M$. We may impose further constraints on M so that each element of M is related with some members of T, and conversely each member of T must be related with some element of M. As for the set M we may take it to be a partial ordered set so that for m_1, m_2 $m_1 \leqslant m_2$ means that m_2 is constituted by m_1. In Thales' possible world M will contain a root, water – so that for any $m \in M$ water $\leqslant m$.

1.4 From *Grundlagen* § 54

How can we differentiate stuff concepts from the other concepts? Can we find an answer in Frege? The following passage is quite pertinent to that but at the same time I find it very elusive.

> "The concept "letters in the word three" isolates the *t* from the *h*, the *h* from the *r*, and so on. The concept "syllables in the word three" picks out the word as a whole, and as indivisible in the sense that no part of it falls any longer under the same concept. Not all concepts possess this quality. We can, for example, divide up something falling under the concept "red" into parts in a variety of ways, without the parts thereby ceasing to fall under the same concept "red". To a concept of this kind no finite number will belong. The proposition asserting that units are isolating and indivisible can, accordingly, be formulated as follows:
>
> Only a concept which isolates what falls under it in a definite manner, and which does not permit any arbitrary division of it into parts, can be a unit relative to a finite Number." [28]

Frege seems to contrast here two different kinds of concepts. We may call them discrete concepts and non-discrete concepts respectively. The latter, we may hope, can give us some clues for stuff concepts. The examples with letters and syllables are meant for discrete concepts, whereas the concept "red" is meant to be a non-discrete. It is a little unfortunate that Frege uses the examples of letters and syllables, which are semiotic items and as such analyzing them we might not avoid the questions involving type-token relationship as well as sign-signified relationship. Nevertheless, at first step a careful reading of the above excerpt may reveal to us that a discrete concept should have the following features.

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[28] See §54, p. 66 of Frege (1884b)

$\mathbf{A}_1$	it isolates its units (in a definite manner)	[*(strongly) isolating*]
$\mathbf{A}_2$	it makes its units indivisible	[*not dividing*]

Suppose Φ is a discrete concept. $\mathbf{A}_1$ says, then, that if x is a Φ then x is isolated by Φ in a definite manner. $\mathbf{A}_2$ says that if x is a Φ then x is not divisible (bearing some connection with Φ). Let us find out some labels for these alluded features. I shall use "isolation", "isolating" or "isolated" to mean the first feature ($\mathbf{A}_1$); and "atomic", "atomicity", "indivisible", "indivisibility", or "not dividing" to mean the second feature ($\mathbf{A}_2$).

Parallelly, we can also delineate the following feature for a non-discrete concept like the concept "red".

> **DIS** If in whatever manner we divide up something falling under a concept then each of the resulting arbitrary parts falls under the same concept again.

For this feature we may use the label "dissectivity". It is quite evident, by the very definitions of dissectivity and indivisibility, that

(i) $\mathbf{DIS} \Rightarrow \neg\mathbf{A}_2$

It is also no less evident that

(ii) $\neg\mathbf{DIS} \Rightarrow \mathbf{A}_2$

If **DIS** and $\mathbf{A}_2$ are distinct features, then (i) and (ii) are not formally derivable from each other.[29] How about the relation between isolation and atomicity at one side and dissectivity at the other side? At this point things become unclear; Frege's allusion is too incomplete. We can consider either of the following formulations.

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[29] If one of (i) or (ii) were derivable from the other then dissectivity (**DIS**) and divisibility ($\neg\mathbf{A}_2$) would be formally same. I don't think they are same notion. Nevertheless, we always tend to take them as same. I like to explain this tendency of ours in terms of a standard model, where a concept Φ is said to be indivisible if ($\neg\mathbf{A}_2$) if $\neg\exists x(x \in S \ \& \ \neg\exists y(y \sqsubset x \& \ x \in S))$ and it becomes

(iii) $\neg\mathbf{A}_1 \mathbin{\&} \neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

(iv) $\neg\mathbf{A}_1 \vee \neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

From (iv) we further get a couple of implications

(v) $\neg\mathbf{A}_1 \Rightarrow \mathbf{DIS}$

(vi) $\neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

Now since (v) follows from (iv) I reject (iv), because I am less inclined to believe what (v) says – that lack of isolation can be a sufficient ground for dissectivity. If we ignore (iv) then we are left with three options of combining these formulations.

Option I = (i)+(iii): $\mathbf{DIS} \Rightarrow \neg\mathbf{A}_2,\ \ \neg\mathbf{A}_1 \mathbin{\&} \neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

Option II = (ii)+(iii): $\neg\mathbf{DIS} \Rightarrow \mathbf{A}_2,\ \ \neg\mathbf{A}_1 \mathbin{\&} \neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

Option III = (i)+(ii)+(iii): $\neg\mathbf{DIS} \equiv \mathbf{A}_2,\ \ \neg\mathbf{A}_1 \mathbin{\&} \neg\mathbf{A}_2 \Rightarrow \mathbf{DIS}$

Each of these options seems to be an equally feasible interpretation of what Frege says in *Grundlagen* §54,[30] whence comes the above quote. All these options show that atomicity (i.e. $\mathbf{A}_2$) is very closely related with dissectivity (**DIS**), either these features are contradictory with each other or one of these features excludes the

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dissective (**DIS**) if $\forall x(x \in S \Rightarrow \neg\exists y(y \sqsubset x \mathbin{\&} x \in S))$. S is here the domain set of the standard model. But I believe that we can get non-standard models where these two notions will not be interdefinable.

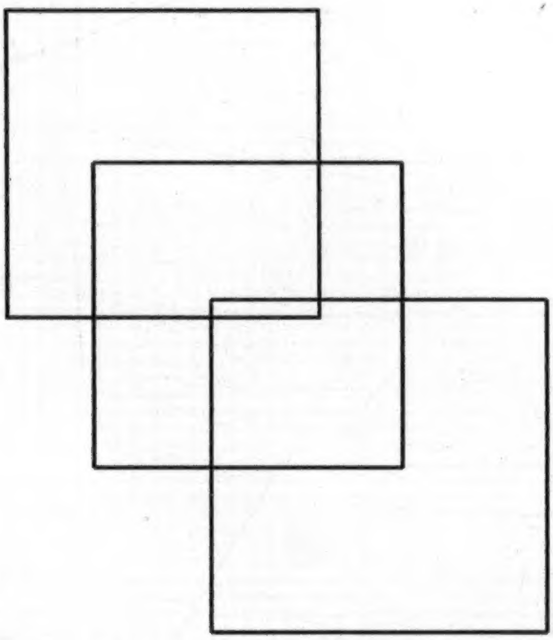
[30] If we cared about the strong and weak senses of the two parameters, indivisibility and isolation, then we could have different pictures; perhaps we would have more options. The option order as presented here reflects my preference. I am least inclined to accept Option III because that would mean atomicity and dissectivity are contradictory – we can neither have them both together nor reject them all together. As for the choice between $\mathbf{DIS} \Rightarrow \neg\mathbf{A}_2$, and $\neg\mathbf{DIS} \Rightarrow \mathbf{A}_2$, I am not convinced that lack of dissectivity necessarily leads us to atomicity, therefore I prefer $\mathbf{DIS} \Rightarrow \neg\mathbf{A}_2$ to $\neg\mathbf{DIS} \Rightarrow \mathbf{A}_2$.

other. This only shows that these two features share something common, in fact they can be both explained mereologically. But how about **A**$_1$, i.e. isolation? Can we treat it mereologically? What exactly is it? Is it an independent factor or something trivial? Or it bears a deeper significance? In other words, What does it exactly mean that a concept is isolating and how can we explain it?

Now, in a way sortal theories try to provide an answer to the above questions (their original questions might have been somewhat different ones). Roughly, their answer is: when a concept is isolating it is a sortal concept – so the concept enables us to differentiate the corresponding objects from one another. This is possible because acquiring this concept we acquire the relevant identity criteria or at least (if no criteria can be formulated) it can show us the corresponding identity condition. How about dissectivity (**DIS**) or indivisibility (**A**$_2$) then? Quine would answer this by saying that indivisibility is what sortal concepts are all about; a sortal concept divide the references in certain manner – so that by dint of that concept we can say "this apple", "that apple", "another apple", "an apple" and so on. In other words indivisibility is "individuation" and this is intimately related with isolation.

Katherin Koslicki (1997) tries out two interpretations for isolation. Following her terminology let us call these two interpretations "isolation as discreteness" and "isolation as boundary drawing". Isolation as discreteness is a mereological interpretation – saying – "A concept *C* isolates what falls under it in a definite manner iff the objects falling under *C* do not overlap"[Koslicki, K.,1997, p. 410]. But such a simple interpretation, Koslicki notes, is not acceptable because we often see objects belonging to a common concept can be mutually overlapping and yet we can isolate. For example imagine three squares overlapping with one another (as shown in the following figure).

Fig 0



We do see that the concept "squares over there" is isolating yet the objects are overlapping. Koslicki then opts for the another interpretation: isolation as boundary drawing – so "[a] concept *C* isolates what falls under it in a definite manner if and only if for any part *p* of an object *o*, such that *o* falls under *C*, it is definite whether *p* is inside the boundary drawn around *o* by *C*." [Koslicki 1997, p. 413]. What does Koslicki mean by boundary here? Is it a boundary like the equator or a surface (be it physical or ideal)? Not at all. It is rather an "invisible conceptual line" [Koslicki 1997, p. 413].She uses the word "boundary" metaphorically. Here lies my objection, for by using the metaphor of "boundary" we hide the notion of isolating rather than explaining it. Let me quote Koslicki here:

> Isolation as boundary-drawing allows for overlap. That is, it is permissible for two objects, *o* and *o'*, both of which fall under *C*, to share a common part. The common part does not obstruct counting, as long as *C*

> still clearly differentiates *o* and *o'* as *two* different *C*s, which only share a part.[31]

So according to this excerpt the concept *C* is isolating if it "clearly differentiates *o* and *o'* as *two* different *C*s". Isolation is then defined in terms of the verb "differentiate". But is "differentiate" more clear than "isolation"? This seems to me a question begging argument. For, there is hardly any difference between these two words unless we stipulate it, either one or both of them, with some theoretical backing. And just using a metaphorical expression like "conceptual line" cannot give us a theory. Koslicki, however, at last embraces a theory saying

> Isolation as boundary-drawing is indeed very close to what Quine means by reference-dividing.[32]

Quine's reference-dividing is nothing but "the principle of individuation" that a sortal is supposed to provide. Koslicki's "invisible conceptual line", it seems at last, could hardly bring any progress.[33]

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[31] Koslicki, Kathrin (1997):p. 413. The underline is mine.

[32] Koslicki, Kathrin (1997):p. 416

[33] What's wrong with the sortal approach? What's wrong with the "principle of individuation" – in the way Quine put it? One reason for my tendency to avoid the sortal approach is that I am not greatly convinced by the claim that certain concepts are said to be associated with identity-criteria (or identity-condition) and whereas certain others are said to be have no such association. The division seems to be a matter of arbitrary choice rather than having a strong ground (or a matter of fact). Why can't we say "this green" and "that green" are either identical or not? And again it seems to me equally possible to maintain that "this water" and "that water" are never comparable in terms of identity/non-identity despite the fact I have seen that "this water" came from "that water". The best way, I propose, is to talk less about identity and try to solve it by some other means. If that is not possible let us take a single standard : at least everything is identical to itself, as Frege(1892a) proposed at the beginning of his 'On Sense and Reference' though very soon he abandoned it, therefore everything has an identity condition, and therefore it makes sense to ask whether "this green" or "this water" is identical with "that green" or "that water" respectively.

1.5 Dissectivity and Objectivity

Let us focus on dissectivity. A stuff, say iron, is said to be dissective because being iron remains an invariant feature across the various partitions of a piece of stuff. So if X is iron, a part of X is iron, a part of part of X is iron and so on. But empirically we know that there is a limitation to this. The relevant parts – as Quine observed – cannot be "too small to count",[34] at least the electrons and protons of an iron atom are not iron. This is known as the minimal part constraint, which – from a more general perspective – might be seen as a question of granularity.[35] Frege also talks about dissectivity, but this is explicitly about the color red, as he writes

> We can, for example, divide up something *falling under the concept "red"* into parts in a variety of ways, without the parts thereby ceasing to fall under the same concept "red".[36]

Frege is quite explicit here that something fall under `RED`, which means that `RED` is not empty. Implicitly, he alludes to a subordination: whatever is red is such that its arbitrary parts are red too, or more formally $(\forall x)\,[\mathtt{RED}(x) \Rightarrow (\forall y)(y \sqsubseteq x \Rightarrow \mathtt{RED}(y))]$.[37] But what can x be so that $\mathtt{RED}(x)$? Is it not a sortal individual like a pen, or a ball so that the pen or the ball is red? If so then we can also claim that $(\forall x)\,[\mathtt{RED}(x) \Rightarrow \varphi(x)]$, where φ is a sortal like `BALL`, `TABLE`, `CHAIR` and `MAN` and so on. But the problem is, dividing an arbitrary sortal we do not always get φ-parts as red again. For example any arbitrary part of a red ball, provided that the ball is of usual sort, is not red again. Generally, we cannot have a sortal φ so that $(\exists x)[\mathrm{RED}(x) \& \varphi(x) \& (\forall y)(y \sqsubseteq x \Rightarrow \mathrm{RED}(y))]$. So how can we save Frege in regard his claim about the dissectivity of the concept "red"?

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[34] Quine[1960 p. 98]

[35] For granularity see Barry Smith (2004)

[36] See p. 66 of Frege, G. (1884b). The emphasis is mine

[37] For the time being let us read $y \sqsubseteq x$ as saying y is an arbitrary part, which has resulted by dividing x in a "variety of ways".

It is not difficult to find a way out for Frege. Take dissectivity to be a higher-order property,

$$\lambda\xi.(\forall x)[\xi(x) \Rightarrow (\forall y)(y \sqsubseteq x \Rightarrow \xi(y))] \quad \text{where } \xi \text{ is a first-order concept}$$

So RED is dissective because $(\forall x)[\mathrm{RED}(x) \Rightarrow (\forall y)(y \sqsubseteq x \Rightarrow \mathrm{RED}(y)]$. Now if we have an instance of RED, then the dissectivity of RED and $(\forall x)[\mathrm{RED}(x) \Rightarrow \varphi(x)]$ implies:

$$(\exists x)[\mathrm{RED}(x) \ \& \ \varphi(x) \& (\forall y)(y \sqsubseteq x \Rightarrow \mathrm{RED}(y)]$$

Now the problem is the minimal part constraint. Blood is red – provided that the drops or portions of blood are *not too small*. It is not the case that any arbitrary part of blood is red rather a part which is not smaller than a relevant threshold level is red. "Blood" is of course not a suitable example right now. For, usually (excepting Lowe, whose view will be discussed in a later chapter), blood as a stuff is considered to be a non-sortal – since we can neither count nor individuate stuff of a given sort. So let us consider an example with a sortal, say a red apple. We call the apple red because it has a red surface, though the inside of the apple is not red. Let us further assume that the apple's surface is uniformly red and apparently the surface has no small patches of other colors. Now because of the fact that the inside of the apple is not red, we cannot say that any arbitrary part of a red apple is red, or in other words it is not true that

$$(\theta\ 4.1) \qquad (\exists x)[\mathrm{RED}(x) \ \& \ \mathrm{APPLE}(x) \& (\forall y)(y \sqsubseteq x \Rightarrow \mathrm{RED}(y)]$$

However, we have an ingenious counter-argument here. RED in this particular case is, the argument will say, dissective not because of the fact that any arbitrary part of the apple is red, rather RED is dissective because of the fact that any arbitrary parts of the apple's surface is red. So to claim that an apple is red, i.e.

$\exists(x)[\texttt{RED}(x) \& \texttt{APPLE}(x)]$ is only a shorthand way of saying that the surface of apple is red, and RED is here dissective because any arbitrary part of the apple's surface is red too. In other words the apple is red and the concept "red" is dissective because

(θ 4.2) $$(\exists x)[\texttt{RED}(x) \& \texttt{APPLE'S\_SURFACE}(x) \& (\forall y)(y \sqsubseteq x \Rightarrow \texttt{RED}(y))].$$

But here comes another problem. We have assumed that the apple's surface is uniformly red and *apparently* the surface has no small patches of other colors. However, the surface is red only apparently but microscopically the picture might be quite different. Magnifying the surface at certain level we may find that there are also non-red patches; this would be more so if instead of red the surface were white – a non-basic color. How can (θ 4.2) be true then? Actually, we find here an ambiguity. There are two quite different and incompatible notions about surfaces and it is not clear how we should view a surface while reading (θ 4.2). We can view the surface of an apple as the molecules of the outermost layer of the apple; this is one view. Or we can view the surface as an ideal plain, like the Euclidean notion of points and lines; this is another view.[38] Let us tag these two views as *physical* and *ideal* respectively. The physical surface has certain thickness, it is subject to physical laws and it is a part of the apple. Whereas the ideal surface has no thickness, it is not subject to physical laws and it is not a part of the apple in usual sense. If we adopt the physical view then RED cannot be dissective since there is the minimal part constraint; hence not just any part of the surface – say a molecule of the surface – is red again. So it seems that the hope lies with an ideal surface – with respect to which RED can be said to be dissective. Unfortunately, in order to make it feasible we must resort to more assumptions or stipulations. That RED is dissective over an ideal surface may not follow from any notion of ideal surface. At least that won't follow from a Euclid-like definition: a surface has length and breadth but no width. We then have to stipulate a definition of an ideal surface so that – the surface is infinitely divisible and moreover if the surface is red (blue, green or of any color) then any arbitrary division of it, however small the division might be, is red (blue, green or of the same color) again. In short the dissectivity of `RED` follows from certain idealization and as such it is not a consequence of physical theories.

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[38] cf. Stroll, Avrum (1979)

If `RED` is dissective, as Frege claims, then it calls for, as I have outlined above, certain idealization along with many stipulations. We can speculate that there is a similar idealization with respect to stuff too. In particular if we take any stuff, say water, as dissective, then that means we can divide a portion of water "into parts in a variety of ways, without the parts thereby ceasing to" be water again. Such a conception of water is quite different from our familiar scientific notion of water, which will be no longer water as soon as we go beyond a water molecule. I shall again tag these two notions about water and thereby about any stuff in general as *ideal* and *physical* respectively. The ideal notion of water then calls for an ideal region (or any other suitable ideal entity) occupied by that portion of water (just like the ideal surface of an apple) so that the region is infinitely divisible and we will get water in any arbitrary subregion of this ideal region.

The assertion that an apple is red, as I have argued, is reducible to the fact that the apple's surface is red. And furthermore the dissectivity of `RED` calls for the case that the ideal surface of the apple is homogeneously red. Likewise the dissectivity of water calls for the case that a corresponding ideal region is homogeneously filled up with water. And by the same way we can also explain how `RED` can be dissective when we claim that red wine is red, viz. the region occupied by the wine (which itself is dissective) is such that every arbitrary subregion is red again. So depending on contexts `RED` can call for an ideal plain or an ideal 3-D region. Following Barry Smith (1994) let me use the generic label "fiat objects" which will cover ideal planes, ideal regions or any other similar notions. The general upshot of my argument is that if we claim that concepts/objects like `RED` and `WATER` is dissective then that calls for corresponding fiat objects.

Interestingly, Frege alludes at these fiat objects in *Grundlagen* §26 while he writes

> I distinguish what I call objective from what is handleable or spatial or actual [Wirklichen]. The axis of earth is objective, so is the centre of the mass of the solar system, but I should not call them actual in the way the earth itself is so. We often speak of the equator as an imaginary [gedachte] line; but it would be wrong to call it a fictitious line [erdachte Linie zu nennen]; it is not a creature of thought, the product of a psychological process, but is ***only*** [nur] recognized or apprehended by thought. If to be recognized were to be created, then we should be able to say nothing positive about the equator for any period earlier than the date of its alleged creation. [p.35] [39]

So the axis of earth, the centre of the mass of the solar system, the equator and the North Sea (which is cited earlier to the above excerpt) all these are fiat objects. They constitute an objectivity beyond "handleable or spatial or actual [Wirklichen]", and which is grasped only through our thoughts though that doesn't mean it is a product of our "psychological process". We may thus aptly call it "the non-actual objectivity". The notions of ideal surfaces and ideal regions are only –

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[39] I am not following here Austin's translation [Frege, G. (1884b)] *in toto*. Austin has emphasized, apparently without acknowledging it, "imaginary" and "fictitious", which were not so in the original [Frege, G. (1884a)]. I have, however, added my own emphasis on "only", for it seems to be a little significant. I also inserted some of the original German words besides the relevant translations. I feel the expressions "Wirklichen", "gedachte" and "erdachte Linie zu nennen" cannot be exactly translated into English. The word "Wirklichen" is very significant and translating it into English as "actual" seems to be not satisfactory. On one hand, the word "actual" might not preserve the original connotation of something related with actions or more precisely the connection with the verb "wirken", which, according to Sluga[1980 p.118, 195], means 'to bring about'. On the other hand, the word "actual" has a connotation of something being opposite of mere possibility, and "Wirklichen" seems to have little bearing on this connotation.

we may speculate – further examples of fiat objects, the non-actual objectivity.

If there are objective ideal regions then a Fregean may argue that the dissectivity itself should be objective too. The objectivity may follow very trivially from Frege's view about objectivity and as well as from some implicit principles from *Grundlagen* (especialy from §27). Frege sees objectivity as something "subject to laws", "can be conceived and judged" and "is expressible in words"[*Grundlagen* §26, p. 35].[40] In terms of these characterizations the dissectivity is at least "expressible in words" and we can conceive and judge it by using our reason. We can also take the dissectivity as a law involving color and space, which in turn – by Frege's account – must be objective too. Now the implicit principles, which I explicate in the appendix, can be formulated as follows.

Upward Principle of Objectivity :

If anything x is objective and furthermore there is a true statement S about x then S is objective too.

Downward Principle of Objectivity :

If any statement S is objective and furthermore S is about something x then x is objective too.

So if we are given something objective then by dint of these principles anything contained in or containing the very given thing is objective too. By similar arguments we can claim that it is objective – albeit it is non-actual – that stuff is dissective.

[see Appendix I, for more about these two principles]

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[40] For a general discussion on Frege's notion of objectivity see Dharasmi (2004).

Chapter 2

"Stuff" or "Stuffs":Grammar, Language and Logic

2.0 Preamble

Let us put the dichotomy in more generalized setting. I shall follow Strawson [1959, Ch.5] in this regard. There are two sorts of categories: Xs and Ys, regardless of whether they are ontological entities or linguistic expressions. Xs are variously called or described as "subjects", "substances", "things", "particulars", "singular terms", "objects", "referring to something", "complete" and so on whereas Ys are variously called or described as "predicates", "properties", "universals", "forms", "concepts", "features", "incomplete", "describing", "general terms" and so on. Now the claim, that the two sorts of categories are different can have a trivial interpretation – saying that an X is just different from a Y. But the Fregean dichotomy endorses a stronger claim – saying that the difference is "absolute" and that this difference reflects something of fundamental nature.[41] And, in addition to that there is the notion of stuff. Is stuff an X or Y or both? This question is entangled with other issues. For example whether it should be "a stuff" or "stuffs" or "stuff". We are ill at ease putting this question into the background. Furthermore our intuition about stuff, our practice with "semantics" and our talk about "mereology" and "logic" are not very harmonious. I am far from being able to bring harmony here. Nevertheless, the present chapter, I hope, can give us some hints to see where the discordance might be. If I am successful then some positive clues might be glimpsed here.

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[41] That the difference is "absolute" is at least implicit in Frege's "On Concept and Object", which was actually a response to a certain Kerry's criticism. And, in Function and Concept (at the end of p. 26) Frege says " ... functions are fundamentally different from objects," (see also p. 38 of Peter Geach And Max Black's translations)

2.1 Grammar

How does the notion of stuff pose problems assuming the dichotomy? Well, stuff seems to have a little bit of hybrid nature for being both X and Y. But before probing this allegedly hybrid nature we need to clarify some relevant issues which seems to me potentially very confusing. This seems to me mainly due to our grammatical analysis.

Take an example of a stuff concept, say "water". Take also a sortal-concept say "tigers" or "a tiger". The two concepts seem to have an ontological difference and we tend to think that the difference is correctly reflected in English and as well as in other (but not necessarily all) languages through the grammatical category of Number. By virtue of this category we can explain why certain inflectional patterns are associated with certain nouns. And eventually basing ourselves on the inflectional patterns we can classify the nouns into Mass and Count, which are in turn two values of Number. For example "water" is considered to be a mass noun because unlike "tiger" it is hardly sensitive to s-inflections. However, there seem to be some questionable assumptions behind the conventional grammar. One such assumption – which is particularly true in English – is : all nouns, in particular if they are common nouns, have to have Number, and each of them has to be tagged with either Mass or Count. I shall call it the pivotal assumption, which is – as we will soon see – associated with some further assumptions. The following points raise doubts about these assumptions.

The pivotal assumption seems to support or be supported by another assumption which I shall call the flattening assumption. The latter says that all nouns have the same amount of importance or bearing regarding ontology, they allude to certain entities which may have different appearances but yet the entities bear same weights and heights. Let us revert back to our old examples of "tiger" and "water". The two nouns are supposed to differ in Number, as one is Count and the other is Mass. Thereby they seem to allude to two different types of entities, but all these entities – whatever types they belong to – have the same ontological footing – or weight or height (whatever metaphors work). This flattening assumption becomes fallacious if it is not properly restricted. Both "tiger" and "noun" are Count nouns but that doesn't mean they have same ontological weights. By the same token "water" and "stuff" are not equivalent in this sense, nor are "water" and "noun". Ontologically, "tiger" or "water" is more specific/significant than "noun" or "stuff". The latter nouns seem to reside at a higher level; they are not *directly* used in our talks about ontology rather they are used in our talk about talk (about ontology). One may often call them, as did Wiggins, dummy variables. Despite their lesser ontic significance these nouns have to abide by Number by default of (English) grammar. There might be a link between Number and ontology. But that link fades away at certain level of genericity. Claiming this I assume that words or lexemes can be ordered in terms of genericity, for example "stuff" is more generic than "water", and former has higher generic level than the generic level of "water" as well as that of "tiger". The flattening assumption makes us believe that the link is always there with the same force and strength at all generic levels. On the contrary, the truth seems to be that at higher levels there seems to be hardly any such link.

My usage of "generic" calls for some further clarification. Suppose – as we may decide because of the dictates of conventional grammar – "stuff" is Mass. Now, water is *a stuff*, so is iron. Therefore water and iron are *two stuffs*. Wait! How can I use expressions like "a stuff" and "two stuffs" when "stuff" is Mass? A ready made answer awaits then, saying that in those expressions "stuff" is used generically. So the suggestion boils down to saying this – that a mass term (in its full fledged grammatical sense) is Mass but the very term can be used generically and having been switched to generic mode the noun becomes Count. Such a suggestion then implies that each common noun, be it in MASS or COUNT, has two different modes of usage – non-generic mode and generic mode. This brings me a couple of problems. First, how to explain the difference between the non-generic mode and the generic-mode. Secondly, how to explain the generic transition, the very transition of a noun from non-generic mode to generic mode. I believe that there are at least some partial solutions to those problems but pursuing those answers may take us too far afield from our present concerns. Nevertheless, it seems that we cannot completely avoid taking a standpoint in regard to genericity. One relevant problem is whether a generic noun denotes any entity. I take it as a working hypothesis that if there is any such generic entity then it will hardly have any ontic significance (and thereby it will be at best a pseudo-entity). That is, believing in the existence of such an entity does not say much about nature of the world; though positing the entity can have a good deal of logico-cognitive value – as it may greatly enhance our cognitive ability.

The pivotal assumption is further strengthened by – let us call it – the sharpening assumption: every noun has to be either Count or Mass, but not both, and thereby there has to be a sharp border line between Count and Mass. This seems to gain support from the lexicographic tendency demanding that the border line between Count and Mass should be sharpened as much as possible. We may, for example, find – let us say – a hybrid noun showing both Mass and Count features. (So though "water" is paradigmatically Mass, it becomes Count when we say "waters" or even sing "the waters of Babylon".) But the lexicographic tendency is : the hybrid noun should be split up further into different nouns – each of which is claimed to have a distinct sense along with a unique Number value. Sometimes the resultant, of such sharpening or splitting up technique, can be very trivial: maybe it is nothing more than some mere syntactical variations or even worse it can be due to some usage of tropes and idioms. I suggest here that it is better to leave the differentiating line as fuzzy at a certain stage, perhaps at much fuzzier a stage than that of lexiocographers' or grammarians' standard. Such a move will be surely conducive to our philosophical inquiries, but more importantly that seems to be reasonable by empirical considerations. There is hardly any point, for example, insisting that the noun "stuff" should be exclusively either Mass or Count[42]. Consider the following sentences expressing the Fregean dichotomy

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[42] I am therefore not offended if somebody writes "Stuffs for sale" or "Meat Stuffs" (which you can find along with a brand name). I rather feel offended when someone claims that he or she

(α) Stuff has both X-nature and Y-nature

(β) A stuff is both an X and a Y

(γ) The stuff is both the X and the Y

(δ) Stuffs are both Xs and Ys

Intuitively, all these sentences share the same (truth) content despite their different grammatical clothing. Moreover, they all seem to be grammatically acceptable. Their main differences lie in terms of how Number is reflected in their respective inflections and there seems to be hardly any ontological significance in such inflections. Evidently in (α) the noun "Stuff" (along with "X-nature" and "Y-nature") is Mass. In (β) and (δ) we can take "Stuff" or "Stuffs" (along with "X" and "Y" or "Xs" and "Ys") as Count. And in (γ) "stuff" (along with "X" and "Y") can be taken as both Mass and Count.[43]

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has been offended by such usages.

[43] The following excerpt from Peter Simons (1987) is quite relevant here.

> It may seem as though simply by using the grammatical singular and plural – 'mass', 'masses' – we have already admitted that masses are individuals, if there can be more than one of them. But this objection confuses grammar with logic: it is right too to say that there is more than one class, but that doesn't make classes individuals. The fact that a natural language like English has only one kind of singular and plural mean that terms designating classes or masses first have to be artificially modified to singular before they can pluralized. But because terms of individuals do not need such modification, it is easy to get the idea that only individuals can be denoted by grammatically singular terms.
>
> [p. 155-6]

2.2 The Hybrid

What are more specific reasons for taking stuff as having the hybrid nature of being both X and Y ? Or to be more precise, Why do we think that stuff falls in between particulars and universals (or between objects and concepts)? A tidy answer goes like this. Stuff is both *concrete* and *general*. Being concrete it shares the property of concrete material objects, which are paradigm examples of particulars. Like the material objects a stuff is a spatio-temporal entity. And being general it shares the nature of universals or concepts, for there can be several particulars instantiating the same universals, several objects falling under the same concept. Thus the two hallmarks, *concreteness* and *generality*, present a stuff with two different faces, one is that of a concrete particular and the other is that of a universal. Let us name these faces as the Object-face (or X-face) and the General-face (or Y-face) respectively. That stuff has a General-face seems to be a more interesting argument. As for the Object-face it seems to be sufficient evidence that stuffs occupy space and time and thus they are concrete. Later on we will see some more arguments illuminating the Object-face.

As for the General-face we observe first certain logico-linguistic features. For example we find that unlike names, mass nouns can be quantified and they can be determined by the definite article[44]. We can cite the following examples to support it.

(1) There is *some* water in the bottle.

(2) *The* water has evaporated.

These observations are trivially consistent with the fact that mass nouns, which are correlates of stuff, are common nouns and as such they are meant to describe the general/common aspects of the world. Of course we should also bear in mind that mass nouns have some distinctive features for being a special kind of common nouns; in particular we cannot use the indefinite singular article "a/an". All these arguments are based on certain logico-linguistic considerations and often they seem to be quite trivial. In the next chapter we will see kindred arguments for differentiating particulars from universals.

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[44] cf. Bacon, John (1973)

Stuff has X-nature because unlike Ys it is concrete, not abstract. Its concreteness lies in the fact that stuff occupies space and time[45]. It has Y-nature because it needs other non-stuff particulars exemplifying or instantiating the stuff. Thus iron cannot exist in itself without being a constituent of something else, which can be an iron bar, an iron ball, a chunk of iron and ~~so on~~ – just like the color red, which cannot exist in itself without qualifying something else – a red flower, a red carpet and so on. More specifically red is known to be a quality and a quality needs to piggyback on a substance. Likewise iron (or any other stuff) needs to piggyback/stand on a thing or a substance – in the Aristotelian sense of "substance" – which can be an iron ball, an iron bar and so on.

Let me dwell a little longer on the Y-nature of stuff. The following sentences, considering the Y-nature of stuff, appear to be logically quite similar.

(1) The ball is made of iron.

(2) The ball is red.

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[45] Often it is argued that stuff partakes in causal interaction and such partaking is considered as another sign of concreteness (see Bealer1975). Such argument seems to assume that causal interaction can happen between Xs. But there are opposite view too (held by Lowe and Armstrong for example): that causal interactions happen between Ys. Considering this disagreement I don't want to claim that stuff's participating in causal interaction is a sign of concreteness.

Nevertheless, the disagreement opens up a relevant point here. If we agree that stuff partakes in causal interaction then depending on our view whether causal interaction involves (exclusively) Xs or Ys we can classify stuff as an X or a Y. But I am not ready to work on a causal theory pertaining to such an argument.

But, is there not, one may retort now, a slight difference between (1) and (2)? For there is surely some difference between the two predicates "... is made of iron" and "...is red", at least the former is more wordy than the latter. This seems to be just an apparent difference due to our linguistic convention. Hardly would be there any change if we said "The ball is iron"[46] instead of saying "The ball is made of iron". And parallelly there wouldn't be any significant change if we used sentences like "The ball is made of red" or "The ball is attached by red" instead of saying "The ball is red". If a ball is red, then the relation between the ball and the color red is said to be predication, or subsumption (in Fregean terminology). Whereas if a ball is made of iron then the relation between the ball and iron is said to be a relation of constitution – the ball is said to be constituted by iron. If we find no difference between the logical forms of (1) and (2), i.e. between "The ball is made of iron" and "The ball is red", then there should be hardly any difference between subsumption and constitution. Thus, by this consideration, both the sentences (1) and (2) have the same logical form. We can parse the sentences as **`Iron`**(the ball) and **Red**(the ball) respectively and constitution can be taken as a special case of subsumption.

The above argument is not very convincing. After all we sense a difference between "red"and "iron". We feel that there is an ontological difference between "red" and "iron". In fact we may claim that from a different perspective the two sentences show up quite different logical forms, mainly by revealing the deeper natures of the respective constituents. Thereby, I assume here that a sentence can have different logical forms in different senses. Thus in one sense the two sentences (1) and (2) have the same logical form – for both these sentences are instances of predication and moreover the two predicates "is made of iron" and "is red" are structurally similar despite their different appearances. Yet, in another sense they can have very different logical forms as the respective natures of "red" and "iron" can be different. I, therefore, assume here without further ado that there can be different logical forms corresponding to a single sentence – or to a single grammatical form of sentences; my assumption, I believe, is quite innocuous as long as logical forms are taken to be whatever can be reached by analyses[47].

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[46] In Indian Languages like Bengali, Urdu and Hindi one says "The ball is of iron" or more precisely "The ball is (of) iron's " or "The iron's ball"instead of "The ball is made of iron". And in English, too, one says "a ball of iron" and "an iron ball".

Let us pursue the matter a little further. Consider the following sentences.

(3) Paper is made of bamboo

(4) The ball is made of bamboo

Unlike (4) the subject of (3) is a stuff, "paper", not an object in the ordinary sense of the word. We may parse (4) as ***Bamboo***(ball) but we are a little reluctant to parse (3) as ***Bamboo***(paper). Why is this reluctance? Part of the reason might lie in our classical picture of form and content. When we say the ball is made of bamboo then we see the ball as a union of certain content and a specific form. But we cannot think of (3) as a similar union of form and content. Instead, (3) is about a relation between different types of contents, paper and bamboo. We can express this relation in terms of subordination: if a certain form is combined with paper then the very form is combined with bamboo too. So the main difference between (3) and (4) is that the former shows a subordination whereas the latter shows subsumption. Here we see subsumption as a unification of form and content.

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[47] King, J. (2002) says that there are often two distinct claims about logical forms, one is about "*a proposition's structure and constituents*" [PSC] and the other is about the *"nature of (one or more) propositional constituents*" [NPC]. These different claims, I should add, then show two different logical forms (or two different senses of the logical form) of a sentence. In terms of King's exposition my claiming that sentences (1) and (2) have a common logical form means that the two sentences have same PSC. And when I claim that they have different forms then I am showing that they have two different NPCs. What is more interesting is King's observation: "a philosopher making an NPC claim ought to be explicit as to precisely what she is saying about the nature of the propositional constituent(s) in question. In many cases, this will require addressing substantial questions in metaphysics" [p. 124]. This observation is quite pertinent to what I am doing here – I am trying to find out the NPCs of sentences containing mass expressions and surely I am more interested with the ontological issues pertaining to stuff.

Basing myself on King's account I like to generalize that there can be different logical forms, even more than two, corresponding to a single sentence. However, at this stage, I like to remain non-committal in regard to any deeper issues on logical forms. A minimal condition for a logical form seems to be that it is an output of philosophical analysis and again by philosophical analysis I only mean what we usually practise in doing philosophy. This may sound a little otiose but any explanation stops at certain threshold points and there cannot be a theory of everything.

But unifying form and content seems to be not the only way of subsumption. We sometime have sentences like

(5) Gold is malleable

Now it is possible to parse these sentences in terms of subordination, yielding thus,

(5.1) Whatever is made of gold is also malleable

or more formally

(5.2) for any x, if x is made of gold then x is also malleable

But how correct is this paraphrasing? Think of a golden watch. We can now say that the watch is malleable. But we can say so only because gold is malleable. Put loosely, it is true that ***Malleable***(the watch) because of the fact that ***Malleable***(gold). The malleability of a watch is then a property derivable from the malleability of gold. We get then two different properties, one pertaining to the watch and the other pertaining to gold. The former can be seen as a derivative property whereas the latter as original. Considering this (5) cannot be paraphrased in terms of terms subordinations, like (5.1) or (5.2).

One may, however, contend that the malleability of gold is actually a property derivable from the malleability of all golden things. If the malleability of gold is dependent on the malleability of all the golden things then paraphrasing (5) into (5.1) or (5.2) is quite an obvious step. For we assume or at least are prone to assume that the quantified variable in (5.1) and (5.2) (in the form of "whatever" or "x") range over a domain of objects, which can be made of gold. Now, malleability is a dispositional property and the contender may have a specific view about dispositions in claiming the priority of the golden watch being malleable over gold being malleable. For example she may hold the view that a dispositional property has to be explained in terms of categorial properties. However, I don't want to enter into this debate on dispositions. So let us go through a different example:

(6) Gold is an element having the atomic number 79

Using subordinations this can be paraphrased into the following sentences,

(6.1) Whatever is made of gold is an element having the atomic number 79

or

(6.2) for any x, if x is made of gold then x is an element having the atomic number 79

But this is plainly absurd. The golden watch is made of gold but that doesn't mean that the watch is an element having the atomic number 79. Thus neither (6.1) nor (6.2) can be a true parsing of (6).

So it is not that a sentence containing mass expression at the subject position can always be paraphrased into subordinations. Using the method of subordinations (and quantification) we often try to avoid accepting the possibility that stuff itself can have certain properties. But sometimes the method may fail; thus we cannot deny it – that stuff can possess properties which are not actually predicable on the corresponding constituted objects.

If stuff is predicable with properties then this shows that it has X-nature too, just like a particular it can instantiate a property, a commonality, or a Y.

2.3 Quine's Gesture

Quine is said to have noticed that stuff shows a peculiar behavior with respect to the dichotomy. Sometimes it behaves like an X and sometimes it behaves like a Y. Quine also found a syntactical correlation with regard to such dual behavior. He observed that it behaves like an X before a copula but it behaves like a Y after the copula. For example in the sentence like "Water flows" or "Water is a fluid" the term "water" is an X, whereas in sentence like "That puddle is water" the term becomes a Y. So what's the problem with a stuff term's having this dual role? The problem is simply the duality itself. For we don't see the duality in other normal cases, the so called sortals, like "dog", "car", "man" and so on. If we are ready to accept abnormality then this duality is hardly a problem. The duality, we may explain, is a role played by the linguistic expressions. The expressions pertaining to stuff sometimes refer to an object and sometimes it refers to a concept. Quine then suggested a solution, accept the stuff term in whatever way it behaves. Thus he writes

> The simplest seems to be to treat it accordingly: as a general term in its occurrence after 'is', and as singular term in its occurrences before 'is'. [Word and Object p. 97]

Let us follow now what Quine says further. In Quine's version an X is an object and so for him when a stuff, say water is X it must be an object. But if we have to treat water as an object then that water-qua-object cannot be like our ordinary familiar objects – trees, cars, my body and so on. The latter objects are well-bounded continuous wholes having specific locations in time and space.[48]

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[48] Quine described them better by saying that they are "mobile enduring objects, identical

Whereas we cannot think of water in such a well-bounded continuous form, for it can be scattered all over in a very irregular and discontinuous ways. But to be a well-bounded continuous whole is not a pre-requisite for an object, not even if the object is concrete. So Quine ventured to suggest that water-qua-object is a scattered object, sprawling all over in discontinuous and irregular ways.

Let us turn to the predicative role of a mass term. Quine kept on insisting that in its predicative role a mass term is just like a general term, a Y, a concept, or a universal. He writes,

> Let it not be imagined that in sanctioning scattered concrete objects we facilely reduce all *multiplicities to unities*, all *generalities to particulars*. This is not the point. There remain, besides the world's water as a total scattered object, sundry parts which are lakes, pools, drops, and molecules: and in singling out such sorts of parts for express mention we still need general terms as usual – 'lake', 'pool', 'drop', 'water molecule'. Treating 'water' as a name of a single scattered object is not intended to enable us to dispense with general terms ... Scatter is in fact an inconsequential detail. General terms are needed as much for distinguishing parts (arms, legs, fingers, cells) of an unscattered object (mama) as for distinguishing parts of the scattered object water. *Scatter is one thing, multiplicity of reference another. Recognition of scattered object as single object reduces the category of mass terms to that of singular terms, but leaves the cleavage between singular terms and general terms intact.*
>
> [Quine, **Word and Object** , 1960, pp 98-99, emphases added]

In general terms what Quine claims here is simply this: no Ys are reducible to or

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from time to time and place to place" (Quine 1960, **Word and Object** p. 92). In "Speaking of Objects"(Quine 1958/1969, p.10) Quine describes the discrete familiar objects more succinctly, saying each of these objects "becomes ... a ***cohesive spatiotemporal convexity***". [my emphasis] definable by Xs. A scattered object referred by the name "water" has (proper) parts which are in turn predicated by the general term "water". So there is a difference between – water as a scattered object or an X on one hand, and water as a concept or a Y on the other hand. But, calling both X and Y "water" is simply a case of homonymy – having same level for two different terms/entities. If that is so then the sentence "Water is water" can be taken as a case of predication or subsumption Water(water) instead of taking it as a case of identity water=water. Quine's view then turns out – at this stage – to be this: there is no hybrid entity corresponding to a stuff-concept, rather it is a case of homonymy. So, in Quinian terms, there is no problem in maintaining the Fregean dichotomy in stuff-predication, since the latter is a case of predication between two homonymous entities.

It may sound strange that "Water is water" is a genuine predication maintaining the Fregean dichotomy. But we do come across similar sentences in our daily life. One can say "Russell is Russell", intending to express not an identity statement but rather a statement expressing the fact that the object which is denoted by "Russell" has the very characteristics that Russell had. Another similar sentence, though not exactly the same, is "Boys are boys" (or more accurately "Boys will be boys"), which can be paraphrased as "if x is a boy then x has the characteristics that x as a boy possesses" or "if x is a boy then x has boyish characteristics". This kind of sentence does not violate the Fregean concept/object dichotomy. In all these sentences the name terms and predicate terms appear to be same. But this in itself should not be a problem for maintaining the duality, for it is quite possible that a concept word and name can appear very similar though they will have different syntactical roles. What seems to be rather problematic is that we seem to pick up[49] the concept in terms of the corresponding name and thus we may end up in a vicious circle. Thus we pick up the Russellian characteristics, that is "the concept Russell" by the name Russell. Our putative Quinian defence thus assumes that the concept is somehow dependent on the corresponding name and we have no means for picking up the concept independently of the corresponding name. But this is seems to be far from the truth . We name a concept as "Russell" only because it is associated with Russell but this does not mean that we don't have independent means of denoting the associated concept called "Russell". We might have noticed the same concept in some other person's characteristic, say in Aristotle and call the very concept "Aristotle".

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[49] I am assuming that like picking an object by using a name we can pick up a concept by using a predicate. But this maybe exactly what is prohibited by Fregean object/concept dichotomy (I haven't examined that possibility yet). If such prohibition really follows then the word "picking" seems to be only a wrong choice but nevertheless the structure of the present argument can be retained by using suitable vocabularies instead of "picking"

2.4 Semantics and Intuition: A Cacophony?

Quine's idea of a scattered object may lure us to find out a suitable formal semantics. We notice that the semantics of a sentence like F(**a**), where F is a sortal concept, is given in terms of extensions. Thus F(**a**) is said to be true if and only if the denotation of **a** is a member of the extension of F. And an extension of the concept F is the class of objects which fall under F. So far we have assumed that F is a sortal concept. What happens now if the predicate F becomes a stuff concept like "... is water" , " ... is made of iron" and so on? Let us take the sentence "This is water" where by using the demonstrative "this" we denote certain water in a certain spatiotemporal location; of course we don't want to mean all the water – the Quinian scattered object. Or we can take the sentence "w is water", where by "w" we designate the very water (which we points out using the demonstrative "this"). The denoted water can be certain stagnant water in the form of pool, puddle, in a certain container (like glass, flask) and so on; or it can be some kind of flowing water – say water flowing in a brook or dripping from a roof. For the present purpose I assume, in order to make things easier, that the water body is some kind of stagnant water – say certain water in a glass. The question is now: given the Quinian account of water as a scattered object what will be the extension of the mass predicate "water" which occurs in the sentences – or more precisely, in the propositions correlated with the sentences – "This is water" or "w is water"? We can now toy with the idea that the extension of "water" is a set of all water bodies. We can then explain: "w is water" is true if and only if the denotation of w is a member of the extension of water. Let us call this way of extending the classical semantic to cover sentences involving stuff-predication simply the *classical model*.

There seems to be an oddity in saying that the extension of the water-predicate is a set of all water bodies. Is not the extension then the scattered object itself? For, we can take water qua scattered object as a set of water bodies too. These two sets, let us call them the extension-set and the denotation-set respectively, are either identical or different. If they are different then there seems to be hardly any hope for explaining Water(water). But if they are identical then we can set the formal truth-condition of Water(water) as saying that the very set is a subset of itself; such a formal setting will only trivialize the matter, and we owe an explanation: why opt for such a setting in these cases while avoiding it in paradigmatic cases. How about the truth-condition of Water(w) then, when w is not the whole water as scattered object? To answer this question we have to be first clear about the denotation of w. If w denotes a single connected water body then we might suggest that Water(w) is true if and only if the denotation of w is a member of the extension-set. But we may denote certain disconnected water and in that case we are pushed to take denotation as rather the set of that very disconnected water and consequently Water(w) is said to be true if and only if the denoted set is a subset of the extension set. The whole procedure then becomes a little ad hoc and unsystematic: we use the membership relation when the denotation of the subject is a connected water-body but we resort to the subset relation when the denotation is a disconnected/scattered water-body.

If we don't like the classical model or set-theory then we may try for part-whole relationships. A mereological model seems to be better, for we may think that mereology involves less ontology (that means fewer entities) than set theory. In such a mereological model we may take the extension of the water predicate to be all the water bodies themselves, and denotation of a subject, say w, is/are just the water-body/water-bodies we want to denote. So Water(w) is true, in the mereological model, if and only if the denotation of w is/are a part/parts of the extension of the predicate Water. Suppose "water" is a name denoting all the water bodies. So in laying down the truth-condition of Water(water) the denoted water-object and the extension of Water predicate collapse to a single entity. Does it then mean that the concept/object dichotomy collapses to a single entity at a certain limit?

I am inclined to favor a negative answer to the question I just raised. No, if – as it is shown in the above mereological model – the denotation of the subject and the extension of the predicate coincide at the said limit, then that doesn't mean that the concept/object dichotomy has collapsed there. We may find a certain anomaly when we push a model to certain limit. Here, we should note that the limit rises against the backdrop of two preconditions. On one hand we have – more or less – an intuitive understanding about certain features of reality; on the other hand we try to explicate or sharpen some of our intuitive understanding using certain tools, which are – in this specific case – models. The concept/object dichotomy seems to be more a matter of our intuitive understanding rather than a feature brought by models. In the sequel by "internal interpretation" I shall mean that to which I have alluded as intuitive understanding, and in contrast, by "external interpretation", I shall mean the explication we do using models or some other tools.

In the light of the above distinction – between internal interpretation and external interpretation – my position is, that what we see as the coincidence of denotation of the water-object and the extension of the water-predicate in the truth-condition of Water(water) is only a picture of external interpretation. We should not take this instance as showing that the dichotomy often breaks down in the internal interpretation. What it rather shows is that often external interpretation cannot represent/show what we grasp intuitively by our internal interpretation. Thus this only shows a limitation of external interpretation. I would also like to point out that even in external interpretation the collapse of the concept/object dichotomy is only an exceptional case of this model; it happens when we want to predicate "being water" of the water-object. But normally, with the other cases of predication, like Water(w), w refers to only some parts of the scattered object. A particular instance of normal cases is when in the corresponding sentences we use a partitive phrase like "a drop of water", "a pool of water", "a splash of water" and so on in the subject position. Usually, the denotation of these phrases is not all the water and there is no concept/object collapse in the external interpretation.

But the problem is that we cannot say that the part-whole relationship is only an artificial feature pertaining to external interpretation. Often the part-whole relationship becomes an intrinsic feature of our target reality. This happens with the notion of stuff. Expressions like "a drop of water" allude to an underlying predication – a drop of water is water; or a drop (of water) is subsumed under or predicated by the concept "... is water". The part-whole relationship coincides with predication. In other words we have true sentences like "A drop of water is water", "A splash of water is water", "A pool of water is water" and so on. The subject expressions of all these sentences are partitive phrases – "a drop of water", "a pool of water" and "a splash of water". So a predication like "A drop of water is water" goes hand in hand with asserting a part-whole relation - "A drop of water is a part of water".

How are these two relationships, the predication underlying these sentences and the part-whole relation, connected with each other? A connection between the predication and the part-whole relationship, as we have discussed so far, is dissectivity – which says that if y is a part of x and x is ψ then y is also ψ (where ψ = iron, gold, water, and so on). But there is a plausibility of another underlying connection saying if x is ψ then x is a part of ψ. In other words there seems to be – as highlighted by this latter connection – hardly any difference between "x is a piece of iron", "x is a part of iron", "x is iron", "x of iron", "iron x" and may be there are more (depending on what natural language we use). All these expressions are equivalent due to, so we feel, a common underlying stuff-predication. In conventional terms we may write ψ(x) in order to express this predication. Intuitively, all this means that x somehow instantiates the stuff-concept ψ, or in other words x is a kind of particular instantiating the stuff-concept ψ. But such an x is, actually, only partly similar to a normal particular. One may even hesitate to call x a particular at all seeing its deviant nature. For example we may take a rain-drop to be a particular instantiating the concept WATER. But that seems to be quite different from a particular horse instantiating the concept HORSE. The latter, i.e. a horse is a normal particular. But is a rain-drop a particular instantiating WATER? That sounds a little deviant use of "particular" as well as of "instantiation". To test our intuition further compare the following assertions in parthood terms.

(i) A rain-drop is a part of WATER.
(ii) A horse is a part of HORSE.

Even if we are willing to accept the extended notion of parthood as suggested there, we seem to have an intuition that the parthood relationships in the two cases are different. How can we explicate that differentiating intuition? One may marshal further intuitions, that (i) is *more concrete* (or *less abstract*) than (ii), thereby the parthood relation seems to be stronger in (i) than in (ii). This will not be very convincing to many of us. But what else can we bring here to convince the skeptics?

2.5 A matter of languages?

HORSE is a discrete concept (which – to use Frege's allusion – isolates its unit in a definite manner). WATER is a non-discrete concept. And according to our faltering intuition parthood relation is more apt with WATER than with HORSE. It seems to be not irrelevant to mention a correlation between stuff-predication and a normal predication involving discrete concepts. Consider the following pair of sentences:

(iii) A rain-drop is a particular instantiating WATER.

(iv) A rain-drop is a particular instantiating RAIN-DROP.

The correlation is this: in some sense a sentence like (iii) is always correlated with a sentence like (iv) but not vice versa. Thus there is an asymmetry. To put it more formally, if $\psi(x)$ is a stuff-predication, where ψ is a stuff-concept – thereby non-discrete – there is also a discrete concept, say S, so that S(x). It is note worthy that in a partitive phrase – like "a drop of water", "a pool of water", "a splash of water" and so on – we can find both the stuff-concept and the correlated discrete concepts. We may put it in the language of subordinations: whenever x is ψ it is also an S. We may call x-as-S an m-instance of ψ , or a sample of ψ . We will have more on this later. In other words WATER is instantiated by various samples or m-instances, like rivers, pools, puddles, ponds and so on. But that seems to be not the case with HORSE. A relevant question is now, How can a sample instantiate a concept or a universal? Is it not rather the samples' content which instantiate the stuff-concept? Henry Laycock [1972, p. 13] puts it quite aptly:

> it is undoubtedly a mistake to speak, ... of *things* like *pools* of water as instances of water: for the concept *water* is not such as to have particular

instances. A pool of water is not an instance of "water" but of "pool of water"; as an instance of "water" we might offer the water *in* the pool.

If we follow Laycock's argument then a lump of coal (or a drop of water) cannot be a "particular instance" of "... is coal". Coal is something, according to Laycock, *in* the very lump of coal, or put differently a lump of coal can be at best a *sample* of what coal is but not the coal itself. Laycock also says, "it is undoubtedly a mistake to speak, ... of *things* like *pools* of water as instances of water". This raises a puzzle. It seems that both the sentences, "A pool of water is water" as well as "A pool of water is a pool of water" are true, and worse they seem to be analytically true. How can truths involving stuff-predication differ from other truths involving solely discrete concepts? In fact there seems to be hardly any difference if we like to view the matter semantically.

Consider the following sentences

(i) A drop of water is a drop of water ✓
(ii) A drop of water is a drop ✓
(iii) A drop of water is a part of water ✓

(iv) A drop of water is water ?

I put a tick mark (✓) at the right side of a sentence that appears to be true. I put a question mark at the right side of (iv) because it is disputable, at least we have Laycock's objection against it. I shall use the sign ✗ if the corresponding sentence appears to be false. The sign ✓/✗ will be used when a sentence appears to be both true and false depending on different reading or senses. Let us compare the sentences with the following groups of analogous sentences.

(i.1) A set of tigers is a set of tigers ✓
(ii.1) A set of tigers is a set ✓/✗
(iii.1) A set of tigers is a class of tigers ✓
(iv.1) A set of tigers is/are tigers ✓/✗

and furthermore

(i.2) A number of tigers are a number of tigers ✓
(ii.2) A number of tigers is a number ✗
(iii.2) A number of tigers are some tigers ✓
(iv.2) A number of tigers are tigers ✓

and still further

(i.3) Some tigers are some tigers ✓
(ii.3) Some tigers are some ✗
(iii.3) Some tigers are some* tigers ✓
(iv.3) Some tigers are tigers ✓

In (iii.3) I make a little stipulation since English seems to have a limitation in this regard. We can imagine a language, let's say it is English*, where there are two words "some" and "some*" having almost the same meaning – in the sense that the two words have the same logical functions – that they both are used roughly like the existential quantifier of formal logic. But the two words differ in terms of their phenomenological appearances, for example they can be pronounced or spelled quite differently. It is also very likely that they may have slight syntactic variations and their (extra-logical) connotations may be significantly different. But these differences have little to do with their having the same logical function; as they converge in this regard the subsequent terms "some tigers" and "some* tigers" are logically the same terms[50]. Consequently sentence (iii.3) *[Some tigers are some* tigers]* becomes (almost) an identity statement. [51]

My reason for inventing the identity statement (iii.3) *[Some tigers are some* tigers]* is to argue that similarly the sentence (iii)*[A drop of water is a part of water]* is an identity statement too. The outline of my argument is this. The logical form of (iii.3) is **E(X) BE= E*(X)**, where **E** and **E*** are operators which are quite alike in terms of logical function, **X** is a suitable category and **BE=** symbolizes the identity relation expressed by using the finite forms of BE verb (in English)[52]. The logical form of (iii) is **F(Y) BE= F*(Y)**, where **F** and **F*** are operators and they are alike in terms of logical function (just like the pair **E** and **E*** are), **Y** is a suitable category and **BE=** is just like before. A difference between the two sentences seems to lie in some kind of category restriction – that in one case we have X (discrete objects and also stuff) and in the other case we have Y (only stuff). There are also some morphological differences between the operator E at one hand and the operators **F** and **F*** at the other hand. But these differences are quite insignificant from the perspective of their logical function.[53]

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[50] In fact in Bangla we can find words "kichu" and "katak" corresponding to some and some* respectively. The semi translation of *Some tigers are some* tigers* will be then *kichu tiger katak tiger*. This is not possible with stuff ; "katak water" is an ill-formed NP and consequently a sentence like "kichu water katak water" will be ill-formed. A couple of further observations are relevant here. First, unlike in English in Bangla (as well as in other Indian languages) the noun "tiger" does not go through plural-inflection in the sentence *kichu tiger katak tiger*, nor is it possible that the word "tiger" is associated with an indefinite article in order to express an equivalent sentence. Secondly there is no BE verb, and in fact no any verb at all, in *kichu tiger katak tiger*.

[51] I am suggested that "a few" (of English) is a near equivalent of "some*" (of my hypothetical English*). So instead of "Some tigers are some* tigers" I could write "Some tigers are a few tigers" in (iii.3).

[52] As I cannot say that BE= is straightforwardly an identity in the sense of classical formal logic I prefer to avoid the classical =. BE= is only intuitively an identity relation (or relationship) which may not be reducible to =. To me BE= seems to be a broader notion than =. Intuitively, the sentence "Some tigers are some tigers" is an identity relation; but in classical logic this will be either something too trivial or nonsense, yet not straightforwardly an identity relation.

Let us try to examine the differences between the two sentences (iii)*[A drop of water is a part of water]* and (iii.3) *[Some tigers are some* tigers]*. We have already noted a difference – that (iii) is about mass terms (in particular it is about "water"), whereas (iii.3) is about discrete countable objects (in particular it is about "tigers"). Another difference lies in the respective structures of the subject terms, "a drop of water"and "some tigers". Notice that in the phrase "a drop of water" we find two nouns "drop" and "water", whereas in the phrase "some tigers" we find only one noun "tigers" and we consider "some" as an adjective.[54]

Now a piece of grammar. When a noun phrase contains multiple nouns we consider one of those nouns as a head noun which we often determine (at least in English) by observing the government and inflectional nature of the phrase. We can explain it by comparing (i.1)*[A set of tigers is a set of tigers]* with (i.2)*[A number of tigers are a number of tigers]*.[55] We determine "set" as the head noun of "*a set of tigers*" by observing that the verb BE has taken the singular form "is" rather than the plural form "are". We would determine the noun "tigers" as the head noun if BE inflected into the plural form "are" instead. Thus "set" is the head noun in the phrase "a set of tigers", which in turn is the subject term of "A set of tigers is a set of tigers". Note that beside "set" the other noun "tigers" is not the head noun. I shall say that "set" is substantial or it has substantially strong role in the phrase "a set of tigers", whereas "tigers" is insubstantial or it has substantially no role in the same phrase. I shall coin the term "substantial role" for this abstract role. The substantial role of a noun is a matter of observing the relevant language, and also we cannot ignore the relevant intentional contexts. It may vary with different combinations and it may not always be that determinate. That the role may vary can be shown by comparing the two phrases "a set of tigers" and "a number of tigers" of the sentences (i.1) and (i.2) respectively. "tigers" is substantial in the latter phrase but it is insubstantial in the former. That a noun may have varying substantial role can be shown by the following examples with "collection".

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[53] It seems that "some" and "some*" are synonymous having the same *logical role* (which I shall call E-role). Then we can paraphrase (iii.3) [Some tigers are some* tigers] into

(i.3) Some tigers are some tigers

So the logical form of (i.3) will be the logical form of (iii.3) and the latter form will in turn shed some light about the logical form of (iii) *[A drop of water is a part of water]*. What is the logical form of (i.3) then? It seems that it cannot be

(a)$\exists$ x. x is a tiger = $\exists$ x. x is a tiger

for (a) is not even well formed. Is it then the following?

(b)$\exists$ x. (x is a tiger& x is a tiger)

That is a kind of a repetition, not seems to be the logical form of (viii). We may also try in vain

(c) $\exists$ x. x is a tiger. x = x

Hardly does any other other formulation – in conventional terms – seem befitting here.

[54] In fact "some", in conventional grammar, is considered to be a limiting adjective. Other limiting adjectives are "two" and "sole". In contrast there are descriptive adjectives, "red","fat", "tall" and so on.

(vi) A collection of books have been sent to the reviewers.

(vii) A collection of books has been her life long dream.

"collection" is insubstantial in (vi) but it is substantial in (vii). A related fact is that the word "collection" in (vi) is a part of the operator "a collection of ...."[56], which in turn functions as a quantifier – like the quantifier "some". The operators (or the functors) "some ..." and "a collection of ..." share a common logical role which we can call E-role[57]. A notable difference between the two operators is that unlike the latter the former contains a noun. But this has no affect when the operator "a collection of ..." [58] in (vi) acts like the operator "some ...", i.e. when the operator takes E-role. We can paraphrase (vi) into

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[55] The underlined nouns are head nouns or I shall say that they are substantially strong.

[56] We can call it a *partitive operator* .

(vi.1) Some books have been sent to the reviewers.

Whether a noun occurring in a noun phrase is substantial or not must depend on various factors, finding which, I think, is a job of a linguist or a lexicographer. My *prima facie* observation is that for some nouns it is more or less fixed – whether they are going to be substantial or not across certain classes of phrases. For example the noun "set" in a phrase like "a set of tigers" is going to be substantial, whereas the noun "number" in a phrase like "a number of tigers" is insubstantial. For some other nouns there seems to be a little bit of flexibility. For example "collection" – as shown in (vi) and (vii) above – can be substantial or insubstantial. This may depend, I guess, on what bigger phrases it occurs in. A parsing of a noun-phrase will reveal what noun is substantial there and what other functional roles are played by the other constituents of the very noun-phrase. An important category – besides the substantial noun (or noun phrase) – thus revealed is that of an operator. For example the two noun phrases "a drop of water" and "some tigers" have two operators, "a drop of ..." and "some ..." respectively. The morphological/constructional difference between the two noun phrases lies in the morphological/constructional difference between the corresponding operators, "a drop of ..." and "some ...". Unlike the latter operator the former contains a noun and that is the root of the difference. But this difference becomes insignificant, at least from logical point of view, when the two operators take E-role.

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[57] This E-role is quite an abstract notion. We may keep it as well as other similar notion as primitive notions, or we may resort to Curry-Lambek style categorical grammar in order to spell this notion of role. But such a step will bring in more logico-linguistic apparatus; I would avoid going towards that direction.

[58] Of course the word "collection" is here insubstantial.

A further difference between the two sentences, (iii) *[A drop of water is a part of water]* and (iii.3) *[Some tigers are some* tigers]* appears to be this that somehow unlike (iii.3), (iii) expresses a part-whole relation indicated by the presence of "a part of ...". But again I argue that this difference is not significant. The two sentences may differ in terms of their respective domain, one is about stuff and the other about discrete objects. But besides that fact they are alike in terms of logical forms. I have argued that despite their structural differences the two operators "a drop of ..." and "some ..." are functionally alike, that they have same quantifying role. By the same token it can be argued that "a part of ..." and "some ..." are quite alike, they play the same quantifying role. It then follows that "a drop of...." and "a part of ..." must have the same functional role. Thus the sentence (iii) *[A drop of water is a part of water]* seems to be logically/semantically very similar to the sentence (iii.3) *[Some tigers are some* tigers]*, and it is nothing about a peculiarity pertaining to stuff.

2.6 Reciprocal Constitution

Perhaps, it might be suggested, that an apt relationship for stuff is constitution, not parthood. If the latter is a broad enough notion there seems to be little difference between these two relationships. Nevertheless, I shall mainly discuss here constitution, and I think what will be argued here has little effect if we prefer the broader notion of parthood. A broader notion of parthood will be somehow (but I don't know yet how specifically) integrated or closely associated with the notion of dependency.

In English the notion of constitution is mainly expressed by the usage of "is/are made of", "consist(s) of" or simply "constitute(s)".We say X is made of Y, X consist(s) of Y, Y constitute(s) X or X is/are constituted by Y – where X and Y are replaceable by a wide range of noun phrases. The latter can be singular, plural, neither singular nor plural or some unclassifiable mixture. Here are some examples with some classificatory comments:

(1) The book is made of paper.

X is singular, Y is a mass noun – both non-singular and non-plural

(2) These books are made of paper.

X is plural , Y is a mass term – both non-singular and non-plural

(3) This building is made of bricks, rods, wood, glass, cement ... .

X is singular , Y is unclassifiable mixture

(4) These buildings are made (up) of bricks, rods, wood, glass, cement ... .

X is plural , Y is unclassifiable mixture

(5) Bronze is made of copper and tin.

X is a mass term, Y is a mass term

(6) This statue is made of copper.

X is singular, Y is a mass term

(7) This statue takes part in constituting copper.[59]

X is a mass term, Y is singular

(8) The population consists of 20% Sunnis and 80% Shiaites.

X is non-singular, Y is a compound of plural nouns

It appears to be a difficult task to bring all these examples under a single banner called “constitution”. Intuitions may falter or diverge about all of them, in particular (6) and (7) together, as expressing a single notion. If we take it as a single notion then it is noteworthy that it can appear sometimes as a one-one relation – as in (1), (6) and (7), sometimes as a many-one relation – as in (2), sometimes as a one-many relation – as in (3), (5) and (8), and sometimes as a many-many relation – as in (4). Let me simply call this arity. So arity in a constitution is a question of whether the constitution involves one-one, one-many, many-one or many-many relationships as suggested by the foregoing examples. Let us be open that the notion of arity might be put in a more general formal framework and along with that there might be more nuanced or bizarre sorts of arities. A relevant question is that whether a constitution of a certain arity can be reduced to a constitution of another arity. For example: whether a constitution of many-one arity is reducible to a constitution of one-one arity. My guess is that though a reduction is sometimes possible it is not always so. But if these books are made of paper then each of these books is made of paper. This is an example of how a many-one constitution is reducible to a one-one constitution. However, I shall assume that one-one constitution is a primary constitution and many constitution of complex arity is reducible to *primary constitution*.

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[59] I would prefer to write her “This statue constitutes copper.” But to sooth the English ear I write now “This statue takes part in constituting copper.”

A general observation: if X is made of Y then X and Y are surely distinct but at the same time they usually share some common features. So, under such a situation we have, (a)There are universal qualities $Q(X)_i$ and $Q(Y)_j$ which exclusively characterize X and Y respectively and (b) Very often there are some qualities P_i shared by both X and Y.

I shall mainly focus here on a formal aspect of the pair (6) and (7). In general terms the pair says if X is made of Y then *in some sense* Y is also made of X. For example if a whole is made of its parts then in some sense its parts are made of the whole. If water is made of all its m-instances then in some sense the later is made of the former. Note I always use here the qualifier “in some sense”. That is a device not to make constitution or “made of” symmetric, or at least not directly symmetric. This is my hypothesis: a primary constitution can be further sharpened into two different senses of constitution – say, either into “β made of” or into “α made of” relation. There is more to tell about this fine tuning.

I need to bring up some notations here. That X is made of Y will be expressed by "X be-made-of Y". This very relationship will be sharpened to either X is α-made of Y or X is β-made of Y. The sharpened relationships will be expressed by "X be-α-made-of Y" and "X be-β-made-of Y" respectively. I expect that these α or β relationships approximate what we informally understand by be-completely-made-of and be-partly-made-of respectively. Intuitively, if X be-completely-made-of Y then that means that all of X is made of Y and to claim that X be-partly-made-of Y means that X be-made-of Y but it is not the case that X be-completely-made-of Y.

What I have said so far might have sounded a little abstract. To make my point more palpable let me bring back example (6): *this statue is made of copper*. Normally, if a statue is made of copper then it doesn't mean that the statue is made of all the copper, for there are other copper items: the other copper statues, copper bracelets, copper wires, copper plates and so on. In such a situation the statue can be said to be-completely-made-of copper, but the copper – I mean, all the copper, which Quine would call a scattered object – is rather partly-made-of the statue, though again all the copper is completely-made-of all the copper items. This is my basic intuition, which needs more honing.

Compare now the two examples (6): "This statue is made of copper" and (7): "This statue takes part in constituting copper." These two examples can be paraphrased into

(6.1) This statue be-made-of copper.
(7.1) Copper be-made-of this statue.

We feel a little ill at ease taking them to be true simultaneously. The reason is that we have an intuition that constitution is asymmetric. This intuition can be preserved once we state the distinction in terms of be-α-made-of and be-β-made-of. I propose to sharpen the two assertions as follows

(6.2) This statue be-α-made-of copper.

(7.2) Copper be-β-made-of this statue.

Now in order to preserve our intuition about the asymmetry of constitution we can set up a principle saying – if X be-α-made-of Y then Y be-β-made-of X and vice versa. The two relations be-α-made-of and be-β-made-of are some kind of formal correlates of the relations be-completely-made-of and be-partly-made-of respectively. Let us call the principle, the principle of reciprocity. One might feel a little ill at ease in agreeing with my claim that if a statue is made of copper then copper is a also in *some sense* made of that statue. But let us note a similar reciprocity with regard to the relation between a part and the corresponding whole. We may promptly agree that the whole is dependent on the part. A little reflection can also persuade us to accept the fact that in *some sense* the part can be dependent on the whole too[60]. Reciprocity doesn't necessarily mean symmetry. And it is also possible that if things are related compositionally (i.e. in a situation when one thing is made of another thing) then there might be multiple relations – among which we can find both a symmetric relation and an asymmetric relation. Furthermore, we will soon see that we can compound a symmetric relation out of some asymmetric relations.

So, according to my suggestion, when X be-made-of Y then that can mean either X be-α-made-of Y or X be-β-made-of Y. That means we can take X be-made-of Y as the disjunction, X be-α-made-of Y or X be-β-made-of Y. If we add the principle: X be-α-made-of Y if and only if Y be-β-made-of X, then that implies that Y be-made-of X. Hence the relation X be-made-of Y becomes a symmetric relation[61]. We further expect that the two relations be-α-made-of and be-β-made-of are asymmetric. A consequence of their being asymmetric is that they are mutually incompatible, i.e. it is never possible to have both X be-α-made-of Y and X be-β-made-of Y[62]. In other words, in Aristotelean terminology, the two relations are contrary, but of course they are not contradictory.

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[60] In a Gestalt/functional whole its parts, which are also functional, are evidently dependent on the whole. An actor is not an actor without the whole setting of stage and the audience. (I take this example from a talk by Kathrin Koslicki).

[61] Let us symbolize the two relations X be-α-made-of Y or X be-β-made-of Y as $x\mathrm{R}y$ and $x\mathrm{Q}y$ respectively. The relation X be-made-of Y can be then defined as (1) $x\mathrm{R}y \vee x\mathrm{Q}y$. The principle which says that X be-α-made-of Y if and only if Y be-β-made-of X can be broken down to the pair, (2) $x\mathrm{R}y \Rightarrow y\mathrm{Q}x$ and (3) $x\mathrm{Q}y \Rightarrow y\mathrm{R}x$. Now applying constructive dilemma over (1), (2)

So far the two relations, α-made-of and β-made-of have been depicted a little formally. Let me return to their intuitive (or semi-intuitive) correlates, which are completely-made-of and partly-made-of respectively. More precisely the two formal relations are intended to correlate with what I shall call the normal cases of constitution. There are also abnormal cases which I shall call limit cases. These limit cases are a little problematic. Normally, if a statue is completely made of copper then copper (I mean all the copper, which Quine would call a scattered object and not of course the very piece of copper out of which the statue is made of) [63] is partly made of that statue (or more precisely copper in general is partly made of the very copper of that statue). But we may have a limit case, say when the statue is made of all (the) copper (of the world). In such a case we have both the facts – the statue be-completely-made-of copper and as well as the copper be-completely-made-of the statue. There, in the limit cases, we see a kind of collapse, or break down, or at least a little anomaly of the asymmetry we find in the normal

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ans (3) we get $yRx \vee yQx$, which means Y be-made-of X.

[62] Here is an outline of a proof showing that if xRy and xQy (which means X be-α-made-of Y and X be-β-made-of Y respectively) asymmetric. Suppose R is symmetric, therefore we have both xRy and yRx (we are of course thinking that there is a case of constitution). By the principle of reciprocity this means that yQx and xQy. Hence we have xRy & yRx &yQx & xQy. In other words, if xRy and yRx then we have xQy & xQy ; so, xRy are xQy compatible with each other. Therefore if R and Q are not compatible non of them can be symmetric. (The outline of proof pertaining to Q will be very similar.)

[63] In the contemporary metaphysics the moot questions are rather: How does the very piece of copper becomes a statue? Are the piece and the statue distinct or identical? and so on. These questions seem to have little bearing on what I am struggling here. To be explicit my problem is : what is that content called copper which has somehow entangled with this statue, with that pot, with those wire pieces and with so many other things? I am more sympathetic to Quine's proposal to call copper a scattered object.

cases.

Let us call the foregoing analysis the reciprocal-analysis of constitution. We have seen that the analysis fails in the limit cases. Despite that limitation the analysis gives us some clue for ambiguous usages with "made of" and perhaps even with "part of".[64] By dint of this analysis we may even make some sense of the following sentences:

(10) Particulars are parts (or made of) universals

(11) Universals are parts (or made of) particulars

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[64] The following example with "part of" may seem a little forced and artificial

(8) This statue is a part of copper.

(9) Copper is a part of this statue.

But I suspect that they appear to be artificial because of some accidental features of English grammar – mainly due to the fact that "part" itself is a count noun and therefore can be singular or plural and if singular we need an indefinite article before it. These rules are not applicable with "made of" since "made" is a participle not a noun. But some other natural languages (like Bangla) may not have these grammatical restrictions and it is quite likely that there are languages that do not have distinction between " .... part of ...." and " ... made of ...". Perhaps, in such a language, " ... made of ..." will be just translated as " ... part of ...".

In a refined way we can rephrase the two sentences as follows

(8.1) This statue is (an) α-part of copper.

(9.1) Copper is β-part of this statue.

Someone may now object to the formulations (9) and (9.1) saying that the usage is just a metaphorical extension of "parthood". But I find the critique's using the word "metaphorical" as too loose usage here. Perhaps, if I am allowed to use "metaphor" like he does, the critique's very usage of "metaphor" is metaphorical too. I think it is much better to give a systematical analysis of our certain usages rather than nurturing a vague or obscure distinction between metaphorical and non-metaphorical usages.

Chapter 3

Arguing for the Dichotomy

3.0 Preamble

In the previous chapter we have seen that stuff is often claimed to have two faces: that of an object and as well as that of a concept. An object and a concept in turn are assumed to be quite distinct types of entities. In other words, there is a big gap or a dichotomy between an object and a concept. But how well justified is this dichotomy? Are there any well established arguments supporting the dichotomy? And how convincing are these arguments? These are the prodding questions of this chapter. Before we begin we should bear in mind that following the Fregean method – which gave rise to linguisticism – we have to set the inquiries in more linguistico-syntactical clothing rather than setting them in terms of the corresponding ontological notions. So, for example instead of differentiating an object from a universal we may reset the problem as how to differentiate a name from a predicate.

There are two main views arguing how to differentiate a particular from a universal. Both these explanations are said to originate from Aristotle. We can formulate the two accounts – or, rather the two explanations – as follows.

(1) (Logico-) Linguistic explanation:

That a name differs from a predicate because the two expressions behave differently with respect to

(i) certain inference patterns

(ii) certain syntactical transformations/formations

For example, we can form a negative predicate (say "...is impossible") out of a given predicate (say "... is possible"), but we cannot do so – make similar formations/transformations – from names to names.

(2) Metaphysical explanation:

Unlike a universal an object cannot be at different places at the same time.

It is worth noting that unlike the Metaphysical explanation the Linguistic explanation is presented in linguistico-syntactical clothing and as such it provides a congenial framework for the Fregean method. It is not unexpected, then, that Dummett (1981) resorts to Linguistic explanation in order to expound Frege's ideas. Besides Dummett, Strawson seems to have chosen the same path, and Strawson's(1974) argument sounds cogent. But the Linguistic explanation is a futile attempt; that is what I shall argue in this chapter. I shall begin by expounding Dummett's(1981) idea first. Strawson's argument will be examined later.

3.1 The Standard Linguistic Explanation

There are, as I gather them mainly from Dummett (1981) and Strawson (1959, 1970, 1974), three different types of linguistic criteria accounting for the difference between a concept and an object (or in support of a concept/object dichotomy). I shall use the labels (A), (B) and (C) to mark these different types of criteria.

(A) *in terms of inference patterns* :

That a name is different from a predicate with respect to certain inferential patterns. We can make those inferences only with respect to names. We cannot do so with respect to predicates

(B) *in terms of Compound formations* :

We can form compound predicates out of certain predicates. We cannot do so with names.

(C) *in terms of certain mutual relations and positions :*

That a name can occur only in subject position whereas a predicate can occur both in subject as well as predicate position. Moreover unlike concepts objects cannot be related in terms of subordination.

Let us go through the first type of criteria, (A), which is supposed to be in terms of inference patterns. We can detail it by providing the following inference patterns

(Ai)

A necessary condition for an expression e to be a name is that from a sentence X containing e we can infer a sentence Y which results by replacing e by "something" in X. More graphically we can write it as

X(e) / ∴ Y, where X(e) contains e, Y results by replacing e by "something"

This rule is known as existential generalization in formal logic. So if we say "e is a dog" then we can infer "something is a dog". Note, the expressions "Fido", "Something", "Everything" and "That" fulfill this criteria; and intuitively we would accept only "Fido" as a name of an object.

(Aii)

Another necessary condition for an expression e to be a name is that if we have a true compound sentence of the form "X(e) and Y(e)" then we can infer a sentence *saying* that "There is something which is both X and Y". Let's write it as follows

"X(e) and Y(e)" / ∴ "There is something which is (both) X and Y", where X(e) and Y(e) contain e

It is noteworthy that in formulating the above conditions I put many expressions in quotes. This I did for a purpose that will be clarified in the next section. Let us note now that applying this criteria we can exclude expressions like "something" and "that" but not of course "everything". For example we know the following inferences are not correct

Something is tall & Something is stout / ∴ Something is (both) tall and stout

That is tall & That is stout / ∴ That is (both) tall and stout

These inferences are invalid because it is quite possible to pick out different individuals using "Something" or "That". Therefore by dint of present criteria we can decide that "Something", "That" and likewise any other demonstratives are not proper names. But we still cannot exclude "everything" from being a proper name as the following inference is valid.

Everything is tall & everything is stout / ∴ Everything is (both) tall and stout

(Aiii)

A further necessary condition for an expression e to be a name is that if a sentence says "It is true of e that X(e) or Y(e)" then we can infer a sentence saying "either X(e) or Y(e)", where X(e) and Y(e) are sentences containing the expression e. More explicitly,

"It is true of e that it is either X or Y" / ∴ "either X(e) or Y(e)", where X(e) and Y(e) contain e

This criterion will then exclude expressions like "everything" from being a name. For example the following inference is wrong

Everything is either a boy or a girl

/ ∴ Either everything is a boy or everything is a girl

So "everything" is not a proper name.[65]

(B) *in terms of compound formations* :

Let us turn to the next group of criteria. A notable difference between a name and a predicate is that any predicate **P** will have a contrary predicate **$\neg P$** so that

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[65] We can also exclude plural noun-phrases (like "these people") or plural pronoun (like "they") using this criteria. For example the following argument is invalid.

They are either hypocrites or fools / ∴ Either they are hypocrites or they are fools

But it is plausible that having been not trained in modern logic one may take the conclusion of the above argument as just a paraphrase of the premise and thus the whole argument becomes valid – because as the conclusion is a paraphrase of the premise it is not possible the conclusion is false while the premise is true. This is of course hardly possible for the argument with "everything".

I assume here that any logic implicit in a Natural language is more or less a matter of empirical investigation rather than a normative study.

for any name **n**, n is **P** is true if and only if it is false that n is **$\neg P$**

This is not going to be true for names. It is not necessary that any name n will have contrary, say n so that

for any name **P**, n is **P** is true if and only if it is false that $\neg n$ is **P**

So corresponding to the predicate ". . . is a philosopher" we also have a predicate ". . . is not a philosopher" so that for any n we have "n is a philosopher" if and only if it is false that "n is not a philosopher". And this is going to be true for whatsoever. But, in contrast we cannot have a parallel rule with names. It is not necessary that for the name "Socrates" there will be another name say "non-Socrates" so that whenever an arbitrary predicate is applicable for the former it will be not applicable for the latter and any predicate inapplicable to the former will be applicable to the latter. Maybe there can be some predicates, applicable to "Socrates" but inapplicable to "non-Socrates" (or not applicable to someone besides Socrates) but this cannot be true for all the predicates. We may discuss more about this rule in the sequel. Let us mark this as the *negation-criterion*.

There is also another kind of formation which broadly says: given the properties P_1 and P_2 (with certain restrictions) we can have a compound predicate $<P_1, P_2>$ so that for any name n and for a certain sentential operator Ω, Ω ($P_1(n)$, $P_2(n)$) is true if and only if $<P_1, P_2>$ (n) is true. In particular if Ω is disjunction or conjunction then we can have the disjunctive property "P_1 or P_2" or the conjunctive property "P_1 and P_2" respectively. Thus if John is tall and John is intelligent we can have the conjunctive predicate "is tall and intelligent" which is true of John.[66] But, it is said, we cannot have similar rule for names. Thus given the fact that John is intelligent and Jill is intelligent it is not the case that there should be an individual, say John+Jill who is intelligent.[67] Let us name this the *compound-criterion*.

(C) *in terms of certain mutual relations and positions* :

The third set of signs or criteria can be described in terms of certain mutual relations and positions. A name, thereby an object, is said to be essentially complete in the sense that it can never play the predicative role, hence become incomplete. In other words a name occurs only in subject position, whereas a concept or a universal can occur both in predicate as well as in subject positions. This description/definition does not meet a minimum logical rigor since it stands on some question begging assumptions in terms of "subject", "predicate", "predicative" and even "complete" and "incomplete". But there lurks a strong intuition: while subsumption binds an object with a concept it can be extended further, binding a lower level concept with a higher level concept; and it is impossible that subsumption binds two objects.

A similar distinction can be observed in terms of subordination. If a concept subordinates another concept then whatever falls under the latter must fall under the former too. Concepts are thus often related by subordination. But we can find no pair of objects so that if one of them falls under any concept the other object will fall under the same concept. This kind of argument has some linkage with the argument pertaining to the previous group of signs or criteria, i.e. ones which are asymmetric with respect to certain formations/transformations.[68]

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[66] I have assumed here that Ω is a binary operator but that is not necessary.

[67] Ramsey (1925) describes Johnson as holding this view.

[68] Strawson (1970) spells out this criterion very clearly. He calls it "*asymmetry between particulars and general characters of particulars in respect of the possession of sufficient and/or*

It is not a difficult task to show that a mass expression behaves like a name in terms of the criteria of groups (A) and (B). Let us begin with group (A) criteria. Each of these criteria shows an inference pattern necessarily related with a name. The inferences patterns we find with a name can be discerned with a mass expression too.

Take the first inferential criterion [of group (A), i.e. (Ai)] saying that replacing a noun in a sentence by "something" we can form a new sentence out of sentence that contains the noun. We can easily find an example of a mass expression showing the very pattern. Here is such an example

Blood is red / ∴ Something is red

Consider now the second inferential criterion (Aii), which virtually says that the conjunctive predicate "both P and Q" – where both P and Q are true of a name "n" – is true of the same name "n". Or, in other words, if both P and Q are *separately/independently* true of "n" then they are *jointly* true of "n". Now, we can find an example with "water", which is a mass expression, satisfying the required criteria. For example, we can infer "Water is drinkable and light" from the true sentences "Water is drinkable" and "Water is light" [that is "... is drinkable and light" is true of "Water" if both "... is drinkable" and as well as "... is light" is *separately/independently* true of "Water"].

And again a mass term shows up its name-like nature in terms of the third inferential criteria (Aiii). For example from the sentence "Alcohol is either bad or good for health" we can infer "either alcohol is bad for health or alcohol is good for health".

What about the status of stuff or mass with respect to (B)-criteria? One of these criteria is – what I call – the negation-criterion. In simple words the criterion says: it is a predicate but not a name that can have a negation. Can we have a negation of a mass term? Suppose corresponding to the predicate "is

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necessary conditions". [see Strawson(1971) p. 103] water" we have a predicate "is not water". So if we have a name then "n is water" is true if and only if "n is not water" is false. Evidently, it seems then that we can form negation out of a mass term when the term is used predicatively.

What I want to argue here is that to some extent, perhaps to a great extent, the Linguistic criteria become very trivial and ineffective tools for giving us a clear picture about stuff. Yes, we can accept that stuff has a hybrid nature of being both object and concept. And the linguistic criteria seem to conform to this hybrid nature only trivially. They seem to be, as will transpire soon, too weak to stand up to close scrutiny.

3.1.1 The Hidden Intensionality in Linguistic Explanation

One problem with the linguistic explanation which I summarized above lies with the very formulations of the inference patterns. Take the formulations (Aii) and (Aiii); I am going to repeat them:

(Aii)

> A necessary condition for an expression e to be a name is that if we have a true compound sentence of the form "X(e) and Y(e)" then we can infer a sentence *saying* that "There is something which is both X and Y". Let us write it as follows
>
> "X(e) and Y(e)" / *therefore*, "There is something which is (both) X and Y"

(Aiii)

> A necessary condition for an expression e to be a name is that if a sentence says "It is true of e that X(e) or Y(e)" then we can infer a sentence saying "either X(e) or Y(e)", where X(e) and Y(e) are sentences containing the expression e. More explicitly:
>
> "It is true of e that it is either X or Y" / *therefore*,"either X(e) or Y(e)"

Note that in formulating (Aii) and (Aiii) I used the word "saying" along with quote marks around the respective premises and the conclusions. I did so in order to emphasize that the logical relation of deduction, which we may unreflectively think of as holding among some syntax-cum-structures of premises and conclusion, should rather be held between the associated propositions or – I would say – the *inner meanings* (of those premises and conclusion). What I am trying to bring about might be hinted thus: sentence A *says* sentence B when the proposition said by A implies the proposition said by B. We may, eventually, avoid talking about propositions and implications; instead the relationship *saying* might be defined in a novel way: it is an intensional relation holding between A and B, or among the sentences, or – more precisely – between two groups of sentences: the premises and the conclusions. Or, in a straightforward manner: if A *says* B then all that means A can be paraphrased – in some stronger sense of the word "paraphrasing" – into B. All these usages – "saying" or "paraphrasing (in some stronger sense)" – eventually allude to some kind of intensionality, something beyond extensionality, thus cannot be captured by mere mechanical procedure. Imagine two different methods and contrast them: one is – I shall call – *intensional* and the other is *extensional*. The idea is this: unlike the former the latter method demands that the formulations of those inference patterns should be exclusively in terms of syntax, that is to say we cannot presume any kind of intensionality and therefore we cannot use the intension involving the notions like – "say" or "paraphrasing" (or even the old notions of "propositions" and "implication"). What I would like to claim now is that we can hardly formulate those inference patterns by the alleged extensional method, or eventually at some level we have to resort to intensionality in order to formulate those patterns.

To substantiate my claim we may begin with a simple example. Take the inference "A / therefore, A". This seems to be obviously a valid inference. But the validity has a necessary condition, that the premise A must *say* the conclusion A. Otherwise, the inference will be invalid – that is if the condition is not fulfilled. For example, the inference "She is by the bank/ therefore, she is by the bank" will not be valid if "bank" means the edge of a river in the premise whereas the same word means a financial institution in the conclusion. The premise doesn't *say* the conclusion here.[69]

Let me put it from a different angle. What are we up to? We want to show that there exist certain inference patterns with respect to sentences containing a (genuine) name. These inference patterns then show certain deduction relations between sentences, or more precisely between a premise and the corresponding conclusion. We formulate these in terms of some schemata which the corresponding premise and conclusion is supposed to fit in. The question is now, In what language? A possible answer is that the language can be a certain natural language, say English, so that the premise and the conclusion are in English and the schema are meant for English sentences. If this is the case then in some sense we can say that the patterns are directly abstracted from English. Here we see an application of the extensional method. For the patterns have to be abstracted here from the syntax of English. And the abstraction is supposed to be done quite mechanically, ignoring any semantic consideration, paying no heed to what is *said* or *meant* by the relevant sentences or expressions. Obviously, the extensional method assumes that the syntax of English or any other language is quite independent from the corresponding semantics. But why should the method rely on a particular natural language, English or any other language? In order to make it more objective, we may think of devising a language – say F – which should be more or less formal. The inference patterns (or the criterial schema) should be then in terms of F; it is through F – that is through the syntax of F and as well as the relevant schema and patterns – we can determine whether an expression of a natural language – say English – is a name or a predicate. So, in order to find out whether an expression of English is a name or a predicate we have to, at first, resort to a translation from English to F. And, here comes intensionality – or the intensional method – as we have to consider what the sentences of N *say* when translated into F.

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[69] I am grateful to my supervisor for pointing out to me this simple example.

Now the extensional method, I claim, is not feasible at all. In other words, methodologically we cannot formulate the inference patterns *exclusively* by a syntax which must be purged of or free from any trace of intensionality or semantics. Suppose, contrary to what I claim, we can do so; that is we have – call it – an autonomous syntax; and we may further suppose that it is specifically an autonomous English syntax. This then ensues a number of problems, even absurdities.

First, there is the problem of practicality and economy. Purging intensionality will cost us enormous extra work. Note, a natural language is very flexible in the sense that a sentence or an expression (which is not necessarily a sentence) is paraphrasable into numerous other expressions (let me use "expression" as a generic term covering sentences and as well as different kind of phrases – noun phrases, verb phrases and so on). We can bind up numerous sentences into a single cluster seeing that all these expressions share a core of semantic content;[70] in other words they – more or less – *say* one another. We may consider that all those sentences are semantically congruent. Suppose, by inventing some transformation rules or some kind of mechanical procedures or algorithms we devise an extensional method: so that we can determine how those sentences are syntactically – that is *only* syntactically, and not intensionally or semantically – congruent. Syntactical congruence will then take over the job of semantic congruence – paving us a way to avoid intension. Furthermore, suppose we were able to extend or apply this extensional method to inference patterns. For example, we can extend the method by enlarging the domain of syntactical congruence. So, parallel to two expressions' being syntactically congruent we may inductively define that two *expression sets* or two *expression structures* can be syntactically congruent. Now, suppose we have an inference pattern P/∴ C. If we allow intensionality then this much of the presentation – just the presentation of the schema, P/∴ C – is enough for us, for we can *see* in the very presentation how the premise and the conclusion is linked; and the very link, I say, must be eventually intensional. But if we like to present or formulate the pattern with the rigor of extensionality then the simple schematic presentation seems to be not enough. Since, meaning or intensionality is not allowed we cannot say that there is any meaning constraint between the premise and the conclusion. Instead of meaning constraint we have to rather show an equivalent class of inferences; an inference pattern – like P/∴ C – then, at best represents an equivalent class of inferences. The extended syntactic congruence – which also relates structures or

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[70] Such a core of semantic content can be explained by, or at least it corresponds to, a kind of semantic congruence; that is to say that two sentences are said to be semantically congruent if they share – or they are supposed to share, by definition – a core of semantic content. I assume here that two sentences' being semantically congruent depends on to what degree we like to have the semantic content. The two sentences may not share the same semantic content if we want to have a more fine grained semantics. Thus an active sentence and the corresponding passive sentence may

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share the same semantic content if we want to define/determine the semantic content in terms of truth conditions. But if we like to include more features besides truth- conditions the two sentences may be no longer semantically congruent.

A different type of example – which, nevertheless, appears to be quite relevant here – comes from comparing two languages and extending the notion of semantic congruence between phrases. So in a coarse sense the English phrase "his car" can be semantically congruent to the French phrase "sa voiture". But in a finer sense they may not be counted semantically congruent as they give different information focusing on different features of the same situation (or truth-condition) – the English phrase provides us the information about the gender status of the possessor and remains silent about the gender status of the possessed whereas the French phrase does exactly the opposite.

sets of expressions – can then serve as the corresponding equivalent relation. So to show an inference pattern we need to spell out the extended syntactic congruence along with the relevant algorithms. This – spelling out of the extended syntactic congruence along with the relevant algorithms – seems to me quite a formidable task, let alone very costly.

Secondly, we face here a problem concerning the *generality* of inference patterns. We try to define a name in terms of certain inference patterns. We show these patterns with respect to the syntax of a specific natural language; here we have specified the natural language to be English (and for the sake of extensionality we thought about an autonomous English syntax). But will this work for all the possible natural languages? If we expect so then we have to think of a (Chomsky style) Universal Grammar underlying all the natural languages and as such the schema of the inferences patterns should be filled up by sentences pertaining to Universal Grammar. But I suspect that the notion of a Universal Grammar is only a working hypothesis of certain linguists and we haven't delineated its complete nature yet.

Third, there is also a problem concerning derivability – the very relation held between the premises on one hand and the conclusion on the other hand. We may look askance at the preservation of derivability when a pattern is said to be congruent to another pattern. Does such congruence preserve derivability? However, I shall not touch upon this question. I am rather interested in a more fundamental question, What do we mean by derivability? Is it not what we usually call validity? Yes, it is. But the "validity" has a strong semantic connotation, which we – swayed by extensionalism – may wish to get rid of, and thereby we may prefer the former terminology – "derivability". So derivability means validity minus the semantic aspect. What is validity then? An argument is said to be valid if it is impossible to have any situation or any model where the premises of the argument can be interpreted as true but the conclusion is false. This bears heavily on semantics; we have to resort to certain key words like "model", "true", "interpretation" and so on. How can we define validity avoiding these key words?

How can we say this conclusion is derivable from this (and that) premise(s) without understanding the meaning of the sentences? What I am trying to say is that – *without a minimal dose of semantics, even though it may be very intuitive and remote, we cannot say that this sentence has been derived from that sentence.*

As for the intensional method, we just assume here a (semi) formal language F in which we have to translate a set of sentences of English (or of any other natural language) and *see* whether the F-counterparts conform to certain patterns. If we find such conformity then we can decide that certain expression of English has name-like feature. Unlike the extensional method, this method relies heavily on intension and semantics. I suspect that the whole procedure of assuming a (semi) formal language F and translating or rather regimenting the English-sentences into F leads to a vicious circle. Unfortunately, I cannot pinpoint the *exact* nature of this circularity; but nevertheless, I think that the intensional method is still a better option than the extensional one. However, as I couldn't give a knock down blow to the extensional method, I would concede the benefit of the doubt: it is not impossible that someone may develop an extensional method in a more clear and non-vicious way.[71] The success of such an attempt will surely depends on bestowing a privileged status to language or rather to certain notion about language. I rather prefer minimizing such reliance on language. In the sequel I will show more problems with relying on language or rather on linguistic analysis.

3.1.2 Strawson's *reductio* argument

I shall now turn to a *reductio* argument offered by Strawson (1974). The argument is meant to justify the type (B) criteria. Roughly – let us recall – such criteria say: we can form compound predicates out of certain predicates, but that is not possible with names. The argument as well as the criteria are, of course, linguistic in nature. So there lurks an assumption, that we can delineate ontology by analyzing language. Let me elaborate Strawson's argument now.

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[71] I am thinking here about the Neo-Fregean like Bob Hale and Crispin Wright. I need to examine their syntactical approach.

As reductio hypotheses let us assume: (i) we can have a negative individual corresponding to a given individual, and (ii) we can have conjunctive and disjunctive individuals corresponding to a given pair of individuals. I shall adopt now (with slight adjustment) Strawson's algebraic style. So if an individual or object *i* falls under a concept *C*, I shall write $i^\wedge C$. Thus $i^\wedge C$ shows the predication between the object and the concept. In fact we can think of a metalanguage enriched with:

(a) signs for individuals: I shall use "*i*" with or without subscripts for the purpose

(b) signs for concepts: I shall use "*C*" with or without subscripts for the purpose

(c) The sign "^" for predication

(d) The negation sign or signs "¬" in various senses – as negation of propositions, of individuals or of concepts. (I could use various subscripts – like "P", "I" and "C" in order to indicate whether the corresponding negation is used with a proposition, an individual or a concept. Adopting such a technique would make things very cluttery and I prefer a simpler presentation.)

(e) parentheses, brackets and braces for grouping (Again, I shall avoid using too many of these – hoping that readers will be able to determine from the contexts whether a negation goes with individuals, concepts or propositions.)

(f) the truth-functional operator signs (of propositional logic)

Furthermore, let us remember that we can also use more specific and familiar words in lieu of individual signs and concept signs.

Now, our contrary hypotheses can be stated as follows:

(NI) *Negative Particulars*

corresponding to a given particular i_1 we have a particular i_2 so that for any concept C,

$[\neg i_1]^\wedge C \equiv i_2{}^\wedge C$

i_2 is then considered to be a negation of i_1, and as such we can write it as $\neg i_1$.[72]

(CI) *Conjunctive Particulars*

corresponding to a pair of particulars i_1 and i_2 we have an particular i_3 so that for any concept C, $i_1{}^\wedge C \,\&\, i_2{}^\wedge C \equiv i_3{}^\wedge C$

i_3 is then considered to be a conjunctive particular of i_1 and i_2.

(DI) *Disjunctive Particulars*

corresponding to a pair of particulars i_1 and i_2 we have a particular i_3 so that for any concept C, $i_1{}^\wedge C \vee i_2{}^\wedge C \equiv i_3{}^\wedge C$

i_3 is then considered to be a disjunctive particular of i_1 and i_2.

Now what are the absurdities these contrary hypotheses lead us to? I quote here Strawson's answer in length.

> It is obvious, however, that these procedures are not admissible; for they lead directly to absurd results. The complementary particular of any given particular, for example, will have to exemplify all the concepts which the given particular does not exemplify. But since some of these will be mutually incompatible, this is impossible. So no particular has a complementary. Again, it is clear that there can be no disjunctive or conjunctive particular of any pair of particulars of which one exemplifies a concept which the other does not exemplify. For the disjunctive particular of any such pair would have to exemplify both that concept and its complement, which is impossible. And the conjunctive particular would

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[72] I keep it open whether such a complement or negation has to be unique. Similarly, I will keep it open about the uniqueness of conjunctive and disjunctive individuals.`

have to exemplify neither that concept nor its complement, which is also impossible.

[Strawson 1974, p. 28]

I shall call the above (quoted) argument *Strawson's refutation* (*of composite individuals/names*). The refutation can be split up into three sub-arguments: (N) against the notion of negative individual, (D) against the notion of disjunctive object and (C) against the notion of conjunctive argument. These sub-arguments can be further spelled out as follows:

(N) In his objection against the notion of negative individual Strawson seems to be thinking about spatiotemporal objects and their determinate concepts like shapes, colors, sizes, weights and so on. The complement of such an object must exemplify all the determinate concepts except the ones exemplified by the very object. Corresponding to each determinable there will be then a host of incompatible determinate concepts exemplified by the negative object. The situation will be the same even if we take non-spatiotemporal objects exemplifying no determinate concepts. For in that case the corresponding complement object will exemplify all the incompatible determinates for each determinable.

(D) In regard to disjunctive objects Strawson's refutation is this. Suppose we have two individuals i_1 and i_2 so that i_1 but not i_2 exemplifies a concept C. i_2 will then exemplify $\neg C$. This means that we will have both i_1^C and i_2^$\neg C$. So the disjunctive individual $[i_1 \vee i_2]$ will exemplify both C and $\neg C$. That means we eventually get the contradiction $[i_1 \vee i_2]$^C & $\neg$ $\{[i_1 \vee i_2]$^$C\}$.

(C) To show the absurdity of conjunctive individual take two individuals i_1 and i_2 so that i_1 but not i_2 exemplifies a concept C. i_2 will then exemplify $\neg C$. If there is a conjunctive individual $[i_1 \& i_2]$ then it will exemplify neither C nor $\neg C$. This is not an acceptable consequence to Strawson.

Let us go deeper. The whole argument seems to rest ultimately on two classical principles of logic : (1) the law of excluded middle (LEM) saying that everything is either A or not-A, and (2) the law of non-contradiction (LNC) saying that nothing can be both A and not-A. LEM is quite evident in (C), as the argument assumes that with respect to any concept a particular must exemplify either the concept or the complement of the concept. (D) uses both the principles, LEM and LNC; so does (N). The two principles can be rephrased as follows.

LEM

Given a concept every individual must fall under either the concept or the complement of the concept.

Or, more perspicuously :

for any concept C and any individual i we have either i^C or i^$\neg C$.

LNC

Nothing can be satisfied both by a concept and the corresponding negative concept.

Or, more perspicuously:

for any i and any C it cannot be the case that both i^C and i^$\neg C$.

What is worth noting here is that the distinction or the asymmetry between objects and concepts has been already presumed in these principles. If we take the above argument as a proof of the distinction then it will be nothing more than a question begging endeavor. We may, however, take the argument as a deconstruction – leading us to see that ultimately the distinction lies in the heart of the bedrock. It is not that the bedrock has not often been shaken by someone or other. The dialectician has questioned LNC claiming that nature may sometime accept or even need contradictions; the intuitionist or the constructionist has questioned LEM claiming that the principle should not be extended beyond finite domains. It is, however, interesting to note that neither the dialectician nor the intuitionist ever questioned the fundamental distinction or the asymmetry between concepts and objects. We may try an inversion – which they didn't do – by inverting the two principles; but we will not, of course, change the heart by either blurring or challenging the fundamental distinction. What happens if we take the following inverses instead?

LEM′

Given an individual, a concept must be exemplified either by the individual or by the corresponding negative individual.

for any individual i and any concept C we have either i^C or $[\neg i]$^C.

LNC′

No concept can be exemplified by both an individual and the corresponding negative individual.

Or, more perspicuously:

for any i and any C it cannot be the case that both i^C and $[\neg i]$^C.[73]

Now, a possible objection is that by toying with inversion I simply interchange the tags of the previous entities – that I am tagging as objects what were conventionally called concepts, and re-tagging as concepts what were conventionally called objects. However, this is not a futile verbal issue – as the objection suggests. The crucial question is, whether we can have a notion of negative individuals, preserving whatever – as either “concept” or “object” – we have already tagged pre-theoretically. I suggest that it is quite possible to entertain a notion of negative individuals hardly affecting our pre-theoretical tagging (habit). More importantly, I claim that introducing such a notion will essentially not change the basic laws of logic. Perhaps, my contention can be spelled out by two theses: (i) that we can introduce negative individuals, and (ii) such an introduction will not infringe the basic rules of logic.

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[73] LEM′ and LNC′ are just inversions of LEM and LNC respectively. The inversions are evident in the structural contrasts among the formulations themselves – just contrast LEM′ with LEM and LNC′ with LNC, it is not difficult to find that "individual(s)" and "concept(s)") have been interchanged in the corresponding formulations. However, one further helpful tip and as well as an explication is this. In case of LEM and LNC the concepts are subjects to (trans)formation – whether as compounds or complements – whereas individuals are *stable* and so they are resistance to (trans)formation. The picture is quite opposite when we bring in LEM′ and LNC′: for there the individuals are subject to transformation – so we can have compound or complementary individuals – but concepts are stable and there is hardly any scope for compound concepts like 'green or not green'.

Let me pause over the first thesis, which says that we can introduce negative individuals. It seems that introducing negative individuals is not a trivial matter. Yet, I believe, such an introduction preserves whatever we have tagged pre-theoretically – either as “object” and “concept”. I shall gloss a couple of points (in the next two paragraphs).

First, a caution : our pre-theoretical notions about objects and concepts should not be confounded with the theoretical explication of those entities. This doesn't, of course, mean that there is no connection or continuity with theory and pre-theory. Like other disciplines philosophy can often be seen as a theoretical explication of what we come across pre-theoretically. The pre-theoretical notion about concepts and objects must be vague at some point, there might be some gaps and even inconsistencies either in our understanding or in the very nature of reality. We should bear in mind that the Fregean dichotomy is a result of theorizing about our relevant pre-theoretical notions. It is possible that what we tag as concepts or objects can be enframed in quite a different theory (which might be, for example, quite from a Fregean theory).

Secondly, my usage of the words “tag” and its correlates may raise an objection. The kernel picture of tagging is that we attach a tag or a label over a thing. More specifically, we label a concrete thing, and usually the recipient of our tagging is not a concept, which is not concrete but abstract. We can extend this kernel picture towards a wider range of all objects and concepts with a tacit assumption that like objects concepts can be tagged too. Now this very assumption can be the target of an objection, that we cannot tag a concept. This objection seems to have a close connection with Frege's "concept horse" problem – claiming that we cannot name a concept – because a concept, unlike an object, is not nameable. The objection seems to assume the Fregean dichotomy of concept/object at the very outset. Since we don't presume a Fregean dichotomy our tacit assumption about tagging concepts seems to be a feasible position. But this position needs a little bit of hedging, which, I hope, will be clarified in furthering my view.

I shall now turn to my second thesis, which says, rather strongly, that introducing the notion of negative individuals will not infringe the basic laws of logic. To vindicate this I assume that negations of various kinds – pertaining to propositions, concepts, or individuals – are interdefinable. Here are three mutual definitions involving negations.

(NPP) *negative predicate definable in terms of the negation of a proposition*

$$i\hat{}[\neg C] \equiv \neg[i\hat{}C]$$

(NIP) *negative individual definable in terms of the negation of a proposition*

$$[\neg i]\hat{}C \equiv \neg[i\hat{}C]$$

The above two definitions also implies:

(NIPP)

$$[\neg i]\hat{}C \equiv i\hat{}[\neg C] \equiv \neg[i\hat{}C],$$

In the light of these definitions it appears that the two inverted basic laws LEM′ and LNC′ are actually equivalent to the corresponding original formulations LEM and LNC, which are defined in terms of negative concepts instead of negative individuals. In fact the two laws can also be reformulated in terms of propositions:

LEMp

for any proposition, $\boldsymbol{p}$ either $\boldsymbol{p}$ is true or $\boldsymbol{p}$ is false.

LNCp

for any proposition, p it is never a case that both p and $\neg p$ can be true together.

Let us return to Strawson's argument now. I shall focus on the sub-argument (D), which is purported to refute the notion of disjunctive individual. We can give a semi-formal explication of the sub-argument in the following manner

Proof 1

Suppose given a concept C we have two individuals i_1 and i_2 so that

1) i_1 exemplifies C *[Assumption]*

2) i_2 does not exemplify C *[Assumption]*

3) There exists a disjunctive individual $[i_1 \vee i_2]$ *[Assumption]*

4) i_2 exemplifies $\neg C$ *[by* 2) *and* LEM*]*

5) i_1^C *[from* 1) *by definition]*

6) i_2^$\neg C$ *[from* 4) *by definition]*

7) $[i_1 \vee i_2]$^C *[from* 5) *and the definition of disjunctive individual]*

8) $[i_1 \vee i_2]$^$\neg C$ *[from* 6) *and the definition of disjunctive individual]*

9) $[i_1 \vee i_2]$^C & $[i_1 \vee i_2]$^$\neg C$ *[from* 7), 8) *and by conjunction]*

10) There does not exist a disjunctive individual $[i_1 \vee i_2]$

[since 9) *goes against* LNC*]*

My purpose for this semi-formal explication is to show where LEM and LNC infiltrate in this kind of argument. Note that this is also a reductio argument – where we show a contradiction and the contradiction is not permitted by LNC. The question is now: if we had LEM$'$ and LNC$'$ instead of LEM and LNC could we reject the notion of disjunctive individual in the manner of Strawson's refutation? The answer appears to be "No", since we couldn't go further down from step 4) and moreover we could not use LNC for reductio. We could, however, reject the notion of disjunctive concept – following a mirror reflection of the argument, admitting the existence of a negative individual, and applying LEM′ and LNC′ instead of LEM and LNC respectively. The argument would then look like as follows:

Proof 2

Suppose given an individual i we have two concepts C_1 and C_2 so that

1) i exemplifies C_1 *[Assumption]*

2) i does not exemplify C_2 *[Assumption]*

3) There exists a disjunctive concept $[C_1 \vee C_2]$ *[Assumption]*

4) $\neg i$ exemplifies C_2 *[by 2) and LEM′]*

5) i^C_1 *[from 1) by definition]*

6) $[\neg i]$^C_2 *[from 4) by definition]*

7) i^$[C_1 \vee C_2]$ *[from 5) and the definition of disjunctive concept]*

8) $[\neg i]$^$[C_1 \vee C_2]$ *[from 6) and the definition of disjunctive concept]*

9) i^$[C_1 \vee C_2]$ & $[\neg i]$^$[C_1 \vee C_2]$ *[from 7), 8) and by conjunction]*

10) There does not exist a disjunctive concept $[C_1 \vee C_2]$

[since 9) goes against LNC′]

Now what Proof 2 demonstrates or suggests is quite the opposite to what is suggested by Proof 1. The latter demonstrates that the notion of disjunctive individual is not acceptable and it assumes that it is rather the notion of disjunctive concept which we should be content with. Whereas it is quite the opposite, suggested by Proof 2. A similar pair of dual proofs are also possible corresponding to part (C) of Strawson's refutation. Something must have gone wrong in Strawson's refutation. The dawning insight is this: the distinction between objects and concepts in terms of compound formation is more a matter of certain conventions, which also include how we formulate laws of logic. Evidently, Strawson's refutation has a question begging status, for it assumes LEM and LNC, which in turn assumes the prevalent asymmetry – that unlike concepts individuals cannot be negated. It would not have the question begging status if LEM and LNC were not there, but without LEM and LNC the reductio wouldn't work. The moral of this dilemma is, of course, we should not try to prove the asymmetry or the dichotomy following Strawson's method (either there is no asymmetry, or the asymmetry is too simple to require any proof). However, a close examination of circularity in Strawson's refutation reveals a subtler aspect of any reductio argument and the refutation seems to lack that subtlety. I shall discuss it elaborately later but for the time being a hint is worth leaving. If for the sake of *reductio* we take an assumption and implicate the assumption as leading to a contradiction, then the assumption has to be taken with certain integrity – by which I mean that the assumption has to be integrated or coherent with some other relevant or similar assumptions. In Strawson's refutation that integrity has been ignored. For example if we assume, for the sake of reductio, that the notion of disjunctive individual is feasible then we should also assume that the relevant basic laws are formulated in terms of disjunctive individual. Unfortunately, Strawson's refutation didn't proceed in that way.

A slightly different defect can be detected in sub-argument (N),[74] which is to refute the notion of a negative individual. Here, the argument proceeds by taking a "particular" or an object to be a spatio-temporal object, endowed with certain determinate properties. Take a spatio-temporal object, say a red-ball. The complement of the concept "being red-ball", as (N) suggests, must then possess all the shades of color except the particular shade of red color which the ball possesses. Since – the argument thus proceeds – more than one shades of color are *mutually* incompatible with respect to an (spatio-temporal) object the notion of a negative individual must be impossible too.[75] At the end the argument we has two noticeable steps – one following another. First there is a step claiming that the negative individual should possess all the shades except the shade of the original object. Then comes – let's call it – the conclusion-step saying that such an object is impossible, because those determinate properties cannot be held together. The former step has evidently used LEM but the conclusion-step has not used LNC at this stage (LNC will come here a little later), rather the conclusion is drawn on the basis of incompatibility of determinate qualities pertaining to a single determinable.

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[74] To remind the reader, here is part (N) of Strawson's refutation:

> The complementary particular of any given particular, for example, will have to exemplify all the concepts which the given particular does not exemplify. But since some of these will be mutually incompatible, this is impossible. So no particular has a complementary.

An object is of course not necessarily a spatio-temporal object. This should be the foremost objection against (N). The subargument, however, has other interesting aspects. Two features are noteworthy. First, even here in (N), Strawson's refutation retains the circularity that we have observed in the other parts. The source of this circularity is of course the usage of LEM and LNC (the latter comes here a little remotely). Secondly, the notion of the complement of a concept, which is quite implicit in LEM, is taken here in the classical sense – that the complement of a concept includes whatever, irrespective of any categorical constraints, are not in the given concept.

Now, we can remove the circularity in (N) by using LEM′ and LNC′ in lieu of LEM and LNC respectively. Let us revise the reductio argument – using LEM′ and LNC′. We are given a particular, say a red ball which we name as *r*.

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[75] I take that two properties, say P and R, are mutually *incompatible* with respect to an object, say o, if it is *impossible* that o is both P and R *together*, otherwise they are mutually compatible (with respect to o). Incompatibility, thus, appears to be closely tied up with impossibility. But this very notion of impossibility has little to do with what we usually call logical/analytical impossibility, rather – we may say – it is a metaphysical or physical impossibility.

Suppose corresponding to r we have a negative object $\neg r$. Being a spatio-temporal object r has a host of determinate properties, and we mark one such property as **R**, which is a certain shade of redness and still another such property as **S**, which is the roundness of a sphere with certain radius.. In other words we have r^**R** and r^**S**. Therefore, by dint of LEM′, with respect to $\neg r$ we should have $[\neg r]$^$\mathbf{R}_1$, $[\neg r]$^$\mathbf{R}_2$, $[\neg r]$^$\mathbf{R}_3$, . . . and $[\neg r]$^$\mathbf{S}_1$, $[\neg r]$^$\mathbf{S}_2$, $[\neg r]$^$\mathbf{S}_3$, . . . ; where $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . are different shades of color besides **R**, and $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, . . . are different determinate shapes besides **S**.[76] The argument which we want to revise says: $\neg r$ cannot hold all these determinate properties $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . and $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, ... , since $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . are incompatible qualities and so are the properties $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, ... So there are now contradictory statements, (1) $\neg r$ holds all $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . and $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, ... , and (2) $\neg r$ does not hold all $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . and $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, . . ., for each of these collections of properties are incompatible. Since we are using here LNC ′ instead of LNC we cannot close the proof for violating LNC, and thereby we cannot go for a reductio. For, we could reach a reductio, or better a counter part of reductio, not by showing an individual having opposite (or contradictory) concepts (and thereby showing a case of LNC violation) but by showing a concept covering two opposite (or contradictory) individuals.

There seems to lie, however, a problem – as we go along the above revised argument; and the problem seems to be inherited from the original argument (N). It was claimed that $\neg r$ holds incompatible properties like $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, ... But, why should we call those properties incompatible? Those determinate properties along with **R** have been incompatible with respect to r, which happened to be a spatio-temporal object. But that doesn't mean that those determinates are going to be incompatible with respect to $\neg r$. This object is not necessarily going to be a spatio-temporal object and as such it is not necessary that the various determinates of various determinables are not mutually compatible when they are held by an object like $\neg r$. In fact we can even prove that $\neg r$ is not spatio-temporal, for if r has the property being spatio-temporal then $\neg r$ must be not spatio-temporal.

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[76] The usage of subscripts in writing $\mathbf{R}_1$, $\mathbf{R}_2$, $\mathbf{R}_3$, . . . and $\mathbf{S}_1$, $\mathbf{S}_2$, $\mathbf{S}_3$, . . . may suggest that there are denumerable determinates corresponding to a determinable. But I hold no definite answers in regard the number of deteminates. I use these subscripts only for the sake of clearly exposing my view. I could use instead a subscript, say "i", along with an index set, say 'Ξ', where the index is said to vary. Such an approach could give a more formal flavor to my presentation. But I prefer, at least at this stage, a more informal exposition and more people to share my idea with.

The upshot is now: $\neg r$ is not a spatio-temporal object and as such it is not necessary that the determinates which it holds have to be mutually incompatible among themselves.

An objection might be offing: Is not $\neg r$ a little bizarre though it is not outright an inconsistent object? The bizarrerie of $\neg r$, one may thus conclude, is enough evidence for rejecting the idea of a negative object. Well, my reply is, we are all familiar with similar bizarreries arising from concepts and negation too – just remember Russell's paradox. The negation of a concept seems to have no better prospects than the notion of a negative individual.[77]

So, it seems now, the notion of a negative individual is not as abhorrent as Strawson tries to convince us.

Let me turn to another possible objection. I might not have taken, someone may argue, proper care of distinguishing object language issues from metalanguage issues. For example – to clarify this objection – the basic laws of logic are a matter of metalanguage and therefore I cannot introduce them at the level of object language. Or the objection may be raised a little differently. In Strawson's argument the basic laws have been in the metalanguage whereas I have pulled them down to the object language. I am not sure whether I can give a straightforward answer to this objection. Nevertheless, I shall allude to some general problems that greatly weaken this objection.

How does Strawson's refutation work? (This is going to be a kind of deconstruction.) There are three factors worth noticing.

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[77] This is reminiscent of neo-Meinongian attempts to make sense of the round square. In fact if such Meinongian objects exist they should include the negative individuals like $\neg r$. (I am thankful to my supervisor for pointing this out to me).

(1) **the structure** *of Strawson's refutation*:

> It consists of three parts or proofs which we marked as (N), (D) and (C) respectively. In each of these proofs only one notion of compound individual is aimed to be refuted. So in (N) we aim at negative individual; in (D) the disjunctive individual; and in (C) the conjunctive individual

(2) *the method of* **reductio ad absurdum**:

> As a proof each of those proofs – (N), (D) and (C) – is a piece of **reductio ad absurdum**

(3) *the thesis of hierarchical* **stratification**:

> This says that any kind of proof, be it formal or informal (and even any kind of discourse), can be partitioned into object-language, metalanguage and even into further partitions – meta-metalanguage and so forth and so on. This thesis also assume a sub-thesis saying that informal proofs (and discourses) are always formalizable (into formal proofs).

These factors, either all jointly or each of them separately, seem to have involved with some kind of fallacy/fallacies. Though I cannot very clearly expose the nature of this fallacy or fallacies, I shall at least clarify some general relevant problems.

At the outset let me note or agree on this: there is an *infinite semantic acscent* – in the sense that we can always have object-language, meta-language, meta-meta-language, and so on. Thus there is an upward partitioning – giving us an infinite number of language layers.

Let us turn to the method of proof known as *reductio ad absurdum*. In a reductio argument we prove that a targeted assumption cannot be true. We have to remember that usually besides the targeted assumption there are also other assumptions. If we reach a contradiction using those assumptions then a more acceptable conclusion is that those assumptions cannot be all true together. But we hardly ever conclude in that way. We rather reject a single assumption, the one which has been targeted at the outset. Let us call the other assumptions besides the targeted one the background assumptions. Now there is also a meta-assumption: the background assumptions are relatively *more stable* than the targeted one. i.e. we prefer rejecting the targeted assumption to rejecting the other assumptions.

So in doing a reductio we need to make an a priori decision – about which we seem to be mostly not conscious – asking the question: what is in the background and what is/are the target/targets? It seems that when we partition the object-level into background assumptions and target-assumption the former are likely to be more or less integrated in certain manner whereas the target remains a little loose from the integrated background.[78]

The problem is now how the target assumption and the background assumptions are related or distributed in hierarchical stratification. The target assumption, it is clear, must be in the object level; but the question is about the background assumptions. Do the background assumptions fall in the object language or in one or other meta-language? Or do we have to split up the background assumptions so that some of the assumptions go to the object language, some go to the first-order metalanguage and some still go to higher level meta-languages, and so on? It seems that the former question can only give us a negative answer. For, on one hand it makes no sense to claim that no background assumptions are there in the object language. The targeted assumption contradicts another assumption and this has to be in the object language; otherwise the contradiction would be between an assumption from the object language and another assumption from the metalanguage – that would be a good example of use-mention confusion. On the other hand, we cannot say that all the rest of the background assumptions are in the object language. For we do have further assumptions about the first-order assumptions – for example we assume that the two first order assumptions cannot contradict, or that some of the assumptions can be more stable than some others. So the only feasible scenario is that the background assumptions should be partitioned in some hierarchical way, as it has been expected by the other question.

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[78] In a trivial case we can take the integration in terms of an epistemic stability

My objector's point is that the basic laws of logic will be in metalanguage, or more precisely in one of the metalanguages. It is not clear to me in which metalanguage the basic laws will go. Will it be in $\mathbf{L}_1$, $\mathbf{L}_2$, or in some other level? Let us not bother about this issue. My counterpoint is that in whatever level of language we put these laws, we cannot presume that the formulations of those laws should be in terms of our familiar mode, which I shall call the concept mode – claiming that the compound formulations are possible only with concepts). Neither can we presume that the formulation should be in some other mode. Proof 1 and Proof 2 rather look like a Boolean duo, i.e. each of them is a Boolean dual of the other and it seems that we cannot decide which one is correct on purely linguistic/syntactic ground. Let me name this problem the symmetry breaking problem. The objector seems to have tried to break the symmetry by imposing a use-mention division. She seems to assume that the questions regarding the concept/object distinction in terms of compound formation should be restricted within the confinement of object language, whereas the distinction should remain unchallenged – or, beyond questions – in some higher meta-language. But that very treatment – that the concept/object distinction can be only questioned while it is in object language, but not be questioned if it is in some meta-language – looks to me a little arbitrary style of breaking the symmetry. I believe that the resulting linguistic syntactical formulation of object/concept distinction is a mere reflection of our linguistic practice – the practice persists in object language as well as in metalanguage.

It is worth pondering on the notion of a formal proof. What do we mean by a formal proof ? To my mind there come two descriptions or definitions:

(1) a proof is a *sequence* of triplets; each of these triplets consists of an index number, a sentence, and a justification saying how the sentences of

various indexed statements are linked by certain rules

(2) a proof is a *tree* where each node is a statement and the root of the tree is called conclusion; moreover the nodes are related among themselves by dint of certain rules

I take the latter description as more primitive than the other,[79] though that is an incidental matter here. The question I want to raise here is, Where should we put a formal proof in a hierarchical stratification? My position is that the formal proof (be it a tree or a sequence) *entirely* goes in the object language. This means that along with a proof the rules of inferences also go inside the object language. In other words the whole formal apparatus goes inside the object language.

How about those two basic laws now – the law of non-contradiction and the law of excluded the middle? They can be taken as rules of inference – if they ever appear in a formal/semi-formal proof; and as such – following my foregoing claim about a formal proof – they should go into the object language too. But, we do not usually express these rules as we have formulated them (like LEM, LEM′, LEMp, LNC, LNC′, and LNCp). We may, however, reformulate or explicate these laws; and while explicating them, we can posit theorems/axioms that – by some means – correspond to the basic laws of logic. Technically, a set of rules and axioms is known as a system, which resides in the object language. Since the system is closed with respect to derivation all the theorems are included in the system too. There are also derived laws which are in fact redundant in the sense that we can replace a proof using the derived laws by an elaborate proof using only the original rules. It is evident that the derived rules are also part and parcel of the system, thereby they are in the object language too. As for the law of non-contradiction we usually have a rule corresponding to it which is known as the introduction rule of negation. We can also have a theorem corresponding to the law of excluded middle. Now this theorem can be in propositional form (like LEMp) or it maybe in predicative form (like LEM) and it seems that we don't encounter anything in objectual form – like LEM′. But it is quite possible to have an axiom system in objectual mode where we can have a theorem corresponding to LEM′. Thus the symmetry breaking of concept and object in terms of linguistic criteria relies on our choice or convention, what mode we prefer in using our language.

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[79] My reason for taking the tree-definition of a proof as more primitive than the sequence-definition is this. An informal proof can be represented by various sequences. These sequences are thus somewhat equivalent or more precisely they are intuitively *isomorphic*. They vary mainly because there is no fixed order for applying the rules of inferences. It seems to me a very difficult task to formalize this isomorphism between two such sequences (without referring to trees). We don't face this problem with trees; there is a very neat definition for tree isomorphism. In fact a proof- sequence can be viewed as a squashed proof-tree. We can squash such a tree in different ways giving us different proof-sequences. These sequences are isomorphic because they are squashed from isomorphic trees.[I guess that if we have a class of proof-trees which are intuitively equivalent and finite then they are unique up to isomorphism.]

My objector may now retort (and that seems to be only alternative she is left with), that these various counterparts of basic laws are a kind of reflection or shadow over the object language of what resides in a metalanguage and by default these laws encode the concept/object asymmetry. As the latter asymmetry resides in the metalanguage we can only use it and lest it become an item of object language we can neither examine nor question that very distinction. The argument then implies that there are certain limits to our inquiry; but philosophical inquiry cannot be reflexive. At this point we seem to have reached at a bottom line. For I take philosophy as a self-reflective discourse – whereas my opponent would hold the opposite view. Denying the reflexivity seems to me a suicidal act for philosophy.

If the linguistic concept/object asymmetry is determined by some default nature of our language and moreover if we are denied to access that very default nature then evidently the whole method of Strawson's refutation turns out to be a self-serving method. This self-serving nature is enhanced by the very structure of Strawson's refutation, which, as we have noted has three subproofs. Each of these subproofs are meant to refute *only* one of the contrary assumptions; surely the relevant reductio hypotheses had never been a conjunction of these contrary assumptions. This seems to be a little bit of a divide-and-conquer rule.

What seems to be more reasonable to consider is, that all those contrary assumptions constitute a Gestalt whole; Strawson's refutation would be more effective if it could refute the conjunction of all the three contrary hypotheses. In this regard we have to be a little careful with respect to using reductio method in philosophical inquiry; like the intuitionists/constructionists we should try to avoid it and find instead a more positive account.

3.2 A Metaphysical Explanation

As I mentioned at the outset: there are mainly two traditions – said to originate from Aristotle – seeking explanation, and even definitions pertaining to the concept/object dichotomy. One tradition – which can be labelled as linguistic – does so by analyzing languages; Dummett and Strawson pioneered this tradition, and we have critically examined some of their arguments. The other method – which can be labelled as metaphysical – has been recently pioneered or rather revived by Armstrong.[80] It is time now to probe the latter method.

I shall examine here the metaphysical definitions – of a universal and particular respectively – suggested by Fraser Macbride[1998, p. 209-10]. He proposes the following Aristotelian definition. (I shall follow his abbreviations here)

(AD) an Aristotelian definition of the particular-universal distinction:

(A1) x is a universal≡ Poss(x is wholly present in many distinct locations at a time);

(A2) y is a particular ≡ Nec(y is located → (y is wholly present in only one location at time ∨ y is partly present in many distinct locations at a time))

Macbride's formulation seems to call for three dichotomies.

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[80] Armstrong, D.M.(1989) is a good example for pioneering this view.

(1) the modal dichotomy of possibility/necessity

(2) the mereological dichotomy of wholly/partly

(3) the location dichotomy of "present in many distinct locations at a time"/ "present in only one location at time".

How helpful are these dichotomies? I have a couple of vague suspicions here. First, the whole suggestion seems to founder on some slippery ambiguities. The notions of part/whole (which appear here in the form of adverbials partly/wholly) might be very ambiguous here. And so might be the notion of location. Secondly, it appears that the dichotomies are neatly separated, but I suspect that some redundancy might be going on here and perhaps we need different notions or different categories for a better formulation.

In order to spell out my suspicions I shall resort to some symbolization. I shall use three pairs of signs: $\Box/\Diamond$, W/P and M/S in order to abbreviate the respective dichotomies. Each dichotomy corresponds to a dimension and each dimension can be in either of two states – which I shall call components. Thus $\Box$, $\Diamond$, W(= wholly), P(= partly), M(= many places), S(= single place) are components from different dimensions. I shall call these dimensions the modal dimension ($\Box/\Diamond$), the mereological dimension (W/P) and the number dimension (M/S). Now we can reformulate the two definitions as follows

(A´1) x is a universal $\equiv \Diamond \mathrm{WM}x$

(A´2) y is a particular $\equiv \Box(y \text{ is located} \rightarrow (\mathrm{WS}y \vee \mathrm{PM}y))$

Universals – according to (A´1) – are always located, whereas particulars – as it is implied by (A ´2) – can be either located or not. We can make the formulation simpler, at least for the time being, by excluding the possibility of non-located particulars. So consider the following reformulations,

(A´´1) x is a universal $\equiv \Diamond \mathrm{WM}x$

$(A''2)$ y is a particular $\equiv \Box WSy \vee \Box PMy$

We will soon see that we cannot go too far with this symbolization. Perhaps, this symbolization is a little misleading but the hope is that sometimes a *faux pas* can give us a better insight. It seems to me that the order of the components in the symbolization is not important. Thus I would like to see that there is no difference among $\Diamond WM$, $W\Diamond M$, $WM\Diamond$, ... We can make $(A''2)$ much simpler by disregarding the first disjunct, $\Box WSy$. Intuitively, $\Box WSy$ is meant for a point which exists completely at a single location and it has no spatial (as well as temporal) extension. Since such a classical notion of points is quite abstract and theoretical we may reject the disjunct altogether with a hope that the notion can be constructed from a more empirical approach. The second disjunct, $\Box PMy$, is meant for our familiar middle-sized objects which extended in space and time, and thereby the disjunct seems to bear more empirical content. So, in place of $(A''2)$ I suggest the following formulation:

$(A'''2)$ y is a particular $\equiv \Box PMy$

I have hinted that the notion of location is ambiguous. In the first instance we have two senses of location; one involving the abstract notions of spatial/temporal indexes like points (or moments) and regions, the other involving concrete things. I shall call them the formal sense and the empirical sense respectively. In the formal sense location is a binary relation between X and Y where X is an entity like object or universal and Y is a set of spaces, by which I shall mean spatio-temporal indexes like points or regions. In the empirical sense location is a binary relation between X and Y where X is either a universal or an object but Y is a set of entities like objects and universals instead of being a set of spaces. Thus, in the empirical sense, a universal can be said to be located at all its instantiations, the universal "cat" is located at all the cats, and a car is located at its various parts. It is evident that in the empirical sense the notion of location is closely involved with the notion of parts.

Ambiguities reside in the notion of part/whole too. Thus – as Aristotle pointed out in Metaphysics 5.1023b (26) – there is a difference between one sense of parthood – when we say that a cat is a part of the species cat – and, another sense of parthood – when we say that a certain wheel is a part of a certain car. Having these two senses of parthood we can have some derived senses of location. For example, we can take a universal as located empirically at all the cats, which in turn are formally located at various spaces. Therefore derivatively the universal *CAT* is formally located at those spaces.

How should we take the claim that a universal is wholly located whereas a particular is partly located? (For the time being let us ignore the modal components). We cannot use two different senses of location, for instance say we use the empirical sense of location for universals and formal sense for particulars. The notion of location has to be a common denominator for both universals and particulars. The formal sense is suitable for the particulars whereas the empirical sense is suitable for the universals. We can make the formal sense work with universals derivatively – hence the universal *MAN* is (wholly) present at each of the spaces where its various instantiations are located. And we can make the empirical sense work with particulars by stipulating that a particular is (reflexively) located in itself.

Let us try to work with the formal sense now. That a universal is wholly located can be paraphrased as saying that a universal is wholly present at each spatio-temporal index occupied by one of its instantiating particulars. But can we call each of these instantiating particulars a part of the universal? We may call them so, as did Aristotle. But that will bring some kind of discrepancy. For instance if we say that those particulars are parts of the universal then it is quite natural to say that the universal is partially, and not of course wholly, present at the different spaces. But that goes against the claim that the universal is wholly present at those indexes. And if a universal is said to be located partly at various places then there remain hardly any differences between a universal and a particular.

We may now try to make a little dent taking location in the empirical sense. Let's claim that it is possible that the universal is wholly located at its various instantiations – i.e. for a universal x we get $\Diamond WMx$. I suggest, that a universal's status of being *wholly* located can be explained by saying that the universal does not depend on its instantiation. This needs a little elaboration. Take the example of the universal 𝓜𝓐𝓝 along with its various instantiations (to which we assign various names). My suggestion is that the ontological status of the universal 𝓜𝓐𝓝 will not be hampered if its instantiations have different or no locations at some particular worlds. That the universal is *wholly* located means, by my suggestion, that the universal is not dependent on those instantiations.

Let us say that a universal x has the instantiations A_1, A_2, ... in a certain world w. In terms of empirical sense of location this means that x is located at the particulars A_1, A_2, ... and these particulars in turn are located in themselves. We interpret the modal notion of possibility as follows. First there are non-modal cases where A_1, A_2, ... just instantiate x in a certain world w. Now we will say that with respect to any world u to which w is accessible it is possible that the universal x is multiply located at u even though at u nothing, not even A_1, A_2, ... might instantiate x. If accessibility is reflexive then $\Diamond WMx$ is also true with respect to w. So my position can be described as that of an Immanent Realist's, because a universal has to have some instantiations though these instantiations need not be in the actual world (or in any world with respect to which we can claim that the universal is $\Diamond WM$). And there is a Platonist flavor because there is a scope for having uninstantiated universals – though that scope emerges from a truncated viewpoint, in the horizon of a single world.

I need to dispel a possible confusion here. One can formulate what I am saying as this

(U) a universal may be instantiated in a world in which no particulars instantiate the universal provided that the world is accessible to another world which has multiple instantiations of the universal.

A formulation like (U) may create some confusion – which results due to using the verb "instantiate" and its derivatives ambiguously. We have to be careful here that there are two senses of instantiation, one is a non-modal sense and the other is a modal sense. A modal notion – say in the form of some modal auxiliaries "may", "can" and so on – is tied up with the modal sense of the word "instantiate"; in contrast no such modal notion is associated when "instantiate" bears non-modal sense. In (U) the word "instantiated", which is the first inflected occurrence of the verb "instantiate" is essentially tied up with the modal auxiliary "may" and therefore it is a case of modal sense of instantiation. Whereas the later two occurrences – "instantiate" and "instantiations" (which are doubly underlined) – are used in non-modal sense of instantiation. Methodologically, we take the non-modal sense of instantiation as primitive notion where from we later define the modal sense of instantiation. The potential confusion might be greatly reduced if we reformulate (U) as

(U′) a universal is possibly instantiated in a world in which no particulars non-modally instantiate the universal provided that the world is accessible to another world which has multiple non-modal instantiations of the universal.

It is noteworthy that one may suggest a different interpretation for modal instantiation of a universal. A universal *x* is possibly instantiated in the world w means, let us say, that some individual *i* in w is such that *i* instantiates *x* in a world w* which is accessible from the world w. This interpretation seems to fit well with the suggestion – that for a universal *x* we get $\Diamond WMx$. The combination of $\Diamond$ (the modal component) and M (the number component) in $\Diamond WMx$ can be taken to mean – that a world is accessible to another world so that the universal has multiple instantiations in the latter world whereas in the former world the universal may remain uninstantiated. As for the mereological component W of $\Diamond WMx$ we may take it to mean that the universal x enjoys some kind of ontological independence, which awaits more explanation ahead. At the same time we also have to cook up an interpretation for $\Box \mathrm{PM}y$ where y is an individual: What can we mean, in other words, that necessarily an individual "is partly present in many distinct locations at a time"?

I have said that unlike an individual, a universal enjoys a certain kind of ontological independence. More precisely the universal is independent from the particulars instantiating it. Take, for example, the universal $\mathcal{CAR}$, and an individual my car, $\mathcal{C}$. $\mathcal{C}$ is only one of the numerous instantiations of $\mathcal{CAR}$.[81] But suppose in a world w, which is different but accessible from our actual world w*, there are no cars. $\mathcal{CAR}$ is then obviously uninstantiated in w. However, we don't want to concede that there is no universal $\mathcal{CAR}$ in w, nor would we like to concede that $\mathcal{CAR}$ can exist without ever being instantiated in any possible world. We are, however, willing to concede that the universal exists in the world w*; as there is the world w – accessible from w – with cars, i.e. in w there are individuals instantiating $\mathcal{CAR}$ .This scenario, following the conventional technique with models, seems to mean that with respect to w (and as well as w*) we have $\Diamond \mathrm{WM}\mathcal{CAR}$. It also seems to suggest – that with respect to w $\mathcal{CAR}$ is ontologically independent of any instantiating cars in w; since by hypothesis there is no individual cars in w but yet, as we would like to see it, $\mathcal{CAR}$ exists in w.

How about claiming $\Box \mathrm{PM}\mathcal{C}$? How can we explain the claim that it is necessary that $\mathcal{C}$ "is partly present in many distinct locations at a time"? A little digression seems to be unavoidable now. Recall that Aristotle distinguished two different senses of parthood. In one sense we can say that a cat is a part of the universal *CAT*. Let us call it the *predicative* sense of parthood. In another sense we may call my hand is a part of my body. Let us call it the *constitutive* sense of parthood.

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[81] According to the prevalent convention I should have used a capital letter, say $\mathcal{C}$ for the universal "car" and a small letter, say **a** for the name of the car. This convention seems to have originated from Frege and it has an implicit suggestion that there is a "fundamental" divide between concepts and objects. As I don't want to presume that dichotomy now I am avoiding the convention. Instead, I use the symbols $\mathcal{C}$ and $\mathcal{CAR}$ for the particular car and the universal car respectively. By this usage I implicitly adopt a working hypothesis, that $\mathcal{C}$ is some sort of part of $\mathcal{CAR}$.

Let us revert to our example of my car *C* now. *C* has various parts, which are constitutive parts of *C*. Some of these constitutive parts can be predicative parts of some other universals. Thus *C* has constituting parts, its wheels, its doors, its lights and so on and these parts are instantiations of some universals, *WHEEL*, *DOOR*, *LIGHT* and so on so forth. Now *C* will definitely not exist, in particular in the actual world, if it has none of these parts in the actual world. And, unlike *CAR*, the existence (and as well as the identity) of *C* will be threatened in any world if its parts – at least if all its parts – are changed or destroyed in that very world. So by □PM*C* – it is necessary that *C* "is partly present in many distinct locations at a time" – means, so we may speculate, that *C*'s existence in w – in which exists – strongly depends on its constitutive parts.

The difference between a universal and an individual then turns out to be this, that an individual is *strongly dependent* on its parts whereas a universal is very *weakly dependent* on its parts. Let us call this dependency part-dependency. So the part-dependency, according to our present speculation, is very strong for an individual whereas it is very weak for a universal. We may say that a universal, say *CAR*, can be empty in a world w but unlike that there cannot be any empty particular in w. Or more precisely: a concept can be empty in any but not in all the possible worlds, whereas we cannot have an empty particular (or an individual) in any world.[82]

Unfortunately the above suggestion does not fare better than the Fregean option. It invites its own problems as well as more unanswered questions. The notions of constitutive parts and predicative parts, so it seems to me, are not much help, and it is less so if the suggested part-dependency relations have to be defined by possible-worlds. I should mention here that in the above suggested interpretations – of $\Diamond \mathrm{WM}\mathcal{CAR}$ and $\Box \mathrm{PM}\mathcal{C}$ respectively – the two modal operators $\Diamond$ and $\Box$ have not been treated consistently, at least not by conventional terms. If treating $\Diamond$ we have to count on the accessible relations among the worlds then why should we ignore those relations for $\Box$? In other words: Why should we have to count on accessible relations for universals but not for particulars? Our suggestions seem to imply that universals are inter-worlds entities whereas particulars are bounded to the relevant worlds. But why?

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[82] We should be careful in distinguishing a name from an object and a concept-word from a concept. I said we cannot have empty individuals though we can have empty names like "Santa Clause"

3.3 Afterthought

The main problem of our above trial seems to lie in the two notions of part-dependency. The two notions are actually contrary, in the (Aristotelean) sense that they cannot be held together. Now surely contrariness can be a mark of a dichotomy and a pair of dichotomous entities will be sharply contrasted if they are mutually contrary. But contrariness is not an earmark of the Fregean dichotomy. What Frege was actually claiming is that there is a "fundamental relation" of logic which he called subsumption. He drew a distinction between subsumption and subordination claiming that the former but not the latter is a "fundamental" relation of logic. "Fundamental" in this sense refers to something which is: (1) primary – for we can explain other relations using this and (2) primitive – so that we don't need to explain it further. Frege seems to have assumed that such a logically fundamental relationship should be unique so that subordination or any other relationship is explainable in terms of subsumption. This fundamental relationship ties up two fundamentally different kinds of entities – objects on one hand and concepts on the other hand. These entities are fundamentally different, and the difference – according to Frege – can only be hinted at. He did so by using the metaphors of complete/incomplete or saturated/unsaturated. The whole view – which can be epitomized as the (Fregean) dichotomy – can be summarized as follow:

> (i) that there is a primary and primitive relationship, subsumption, which is metaphysically important for having a unique role in binding (ontological) entities.
>
> (ii) that there are two fundamentally different kinds of entities, concepts and objects.

We may challenge these points tinkering with various alternatives. For example:

> (a) Maybe there is a different relation or relationship which is primary or primitive – in some sense.
>
> (b) Maybe there is no such relationship so important and unique. Instead, there might be multiple relationships none of which is less important than another.
>
> (c) Maybe it is wrong to think that there are just two different ontological categories, concepts and objects. Instead there might be more categories, or just one category.
>
> (d) Maybe the basic or primary categories – if there are any – are too novel; quite different from our conventional formats of objects or concepts.

These are not mutually exclusive alternatives. Strawson[83] has tinkered with (a), which might have some connection with (c). His central idea is this: there can be sentences – he called them "feature-placing sentences" – which will not mention any individuals or objects; but, nevertheless, they can be true. In other words there might be facts not pertaining to any objects or individuals. For example, "It is raining"; the sentence is true but there is no individual.

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[83] See in particular Strawson (1954) and Strawson (1959, esp. Chs. 6 – 8)

Strawson(1954, p. 37) then contrived more examples:

Music can be heard in the distance.

Snow is falling.

There is gold here.

The idea is then: these feature-placing sentences are more important than the normal ones, like "Strawson is a man". Obviously, the last sentence is a paradigm of predication or instantiation. Let us say that the normal sentences – which must involve individuals – are *predicative*. In contrast, feature-placing sentences are – let us say – *pre-predicative*. The suggestion is then: any predicative sentence must be preceded by some corresponding pre-predicative sentences. Thus, for example, the predicative sentence "There is a cat" must be preceded (in some sense of "precedence") by some pre-predicative sentences like "There is cat-feature here".The incumbent problem is then to provide a theory explaining the transition – say, of our cognitive development – from the pre-predicative stage to the predicative stage. What is more relevant for us is that stuff – or better, the notion of stuff – seems to have a close tie with the pre-predicative stage.

Strawson is not alone in his camp. Quine[84] has struggled with similar ideas too. And the distinction between predicative and pre-predicative stages is not unheard of even in Continental philosophy.[85] I shall, however, not pursue this line of thought here. Of course, this is mainly due to my present limitations. But, there remain some nuanced issues – involving what paradigms we choose for our philosophical thought. It seems to me that the alluded line of thought, at least the way Quine and Strawson pursue it, is more concerned with our language acquisition and cognition rather than saying anything straightforward about ontology. Is the pre-predicative mode ontologically more important than the predicative mode? A clear answer – whether it is "yes" or "no" – seems to be not possible from these writers. The problem seems to lie with how ontology is related with other areas – in particular, how it is related with epistemology, cognition, languages and sciences. What should we mean by "ontologically (more) important"? Ontology seems to be a less autonomous area in the hands of these authors. Whereas I prefer more autonomy for ontology.[86]

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[84] See in particular Quine, (1958/1969)

[85] So far I remember that Edmund Husserl developed a distinction between predicative and pre-predicative stages at the outset of his **Formal and Transcendental Logic**. And I believe, though I cannot now find the reference, that Merleau-Ponty followed the distinction.

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[86] I leave out mentioning "disposition", which has become a catchword in recent metaphysics. I must confess that I am not familiar with all the bustling surrounding the notion. Nevertheless, from a cursory look it seems to me that it is not an easy task to fit dispositions into the Fregean format: with concept-object dichotomy and extending subsumption towards higher-order concepts. One possible option seems to me: to treat disposition as something too novel to be appropriate for the Fregean dichotomy. This would of course pave a way to the alternatives (d) or (b) that I surmised.

A question maybe asked now: Is stuff a disposition or a bundle of dispositions? One may be tempted to answer this positively. But I would prefer to remain discreet.

Chapter 4

The Loweian Quartets

4.0 Preamble

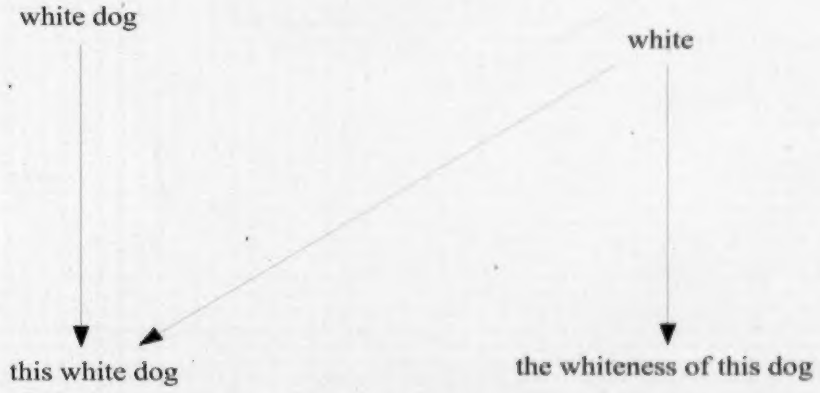
In the last chapter we have seen that how futile often the arguments are – be they from the linguistic school or from the metaphysical school – when they try to establish the dichotomy by proposing some criteria for objects or concepts. Yet, I don't think that my counter-arguments are conclusive enough – as they have left some stones unturned – to declare that the dichotomy is a mere chimera. There is, however, an opposite option: just accept – without either questioning it or supporting it with elaborate arguments – the dichotomy along with the relevant relationship, called instantiation. This option might be even fruitful in the sense that it may help us see more hues than we would see otherwise. Interestingly, the path has been shown again by the master, Aristotle (mainly, not by what he said directly but by what he did).

In recent times E. J. Lowe is a close follower of Aristotle. He builds up his metaphysics following the *Categories*, which being an earlier work by Aristotle has a different theory than the better known *Metaphysics*. In this chapter I shall delve into some of Lowe's arguments with a view to finding what they imply regarding stuff. But unfortunately, we will see at the end, the notion of stuff does not fit well into Lowe's framework. This suggests, though not conclusively, that there remains a tension between the idea of stuff and the conceptual framework we have inherited from Aristotle.

4.1 The Aristotle-Lowe Quartet

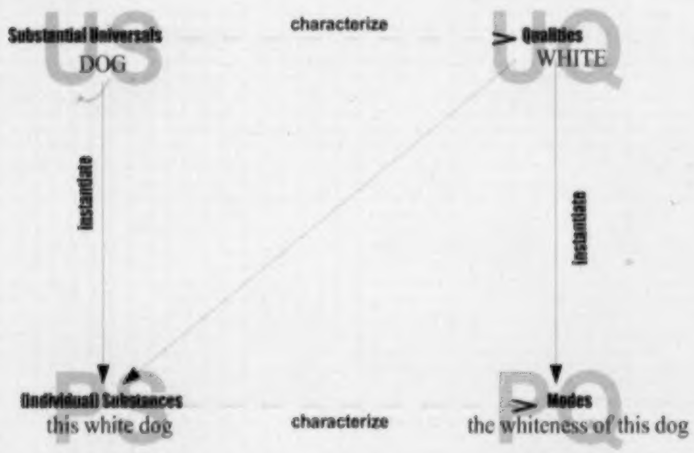
Perhaps rather than wondering about the difference between a universal and a particular we should look at the (formal ontological) relationship between them. We call this relationship instantiation, which we may take to be a primitive notion. A paradigm case of instantiation is when we assert "This is a dog" by pointing to a dog. "dog", in "This is a dog", is a sortal concept and what we point out by using the demonstrative "this" is said to be an instantiation of the very concept "dog". In other words the particular dog or just the particular is said to have instantiated the concept "dog". But there can be various kinds of instantiation. Suppose the very particular dog happens to be a white dog. One can say now that the particular dog instantiates the quality "white" as well. Often, it is claimed that there is another particular, the whiteness of the dog – which (actually) instantiates the quality "white". We call this an "abstract particular". Now, all these instantiations can be brought under the following single picture.

Fig 1



The item at the head of each of the arrows, in Fig 1, is said to instantiate the item at the corresponding tail. Lowe enriches this picture by adding another formal relation, called *characterization*; eventually, we get his four-category ontology, epitomized by – what he calls – the "Ontological Square", as shown below (Fig 2).

Fig 2


US
Substantial Universals
DOG
characterize
UQ
Qualities
WHITE
instantiate
instantiate
PS
(Individual) Substances
this white dog
characterize
PQ
Modes
the whiteness of this dog

The four corners of the above rectangle (in Fig. 2)[87] correspond to Lowe's four basic ontological categories, whose genesis is in the *Categories* of Aristotle. The ontological categories are labelled as: Substantials, Substantial Universals, Modes and Qualities. I abbreviate them, as it is evident in the diagram, into PS, US, PQ and UQ respectively. They are produced by criss-crossing two (Aristotelian) dichotomies, one – between particulars(P) and universals(U) and the other – between, as I like to say, substancehood (S) and qualities(Q). I shall abbreviate the dichotomies as P/U and S/Q respectively. There are then four possible combinations: PS, PQ, US and UQ, as shown in the following table.

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[87] There is a subtle change from Fig 1 to Fig 2. In the latter the substantive universal is only DOG and is instantiated by a particular dog which is incidentally – either being a part of an *accident* or an *essence* – a white dog. The distinction between an accident and an essence is very important for an Aristotelian like Lowe. One implication of this distinction is that DOG is a substantial universal or a natural kind but not of course WHITE DOG. WHITE is a quality or an attribute, and an attribute can – either accidentally or accidentally – characterize a natural kind. In the light of this clarification Fig 1 may appear a little misleading. But for heuristic reason I prefer not to bring any change in Fig 1.

Table 1:

	Substancehood	Quality
Universal	US **Substantial Universal**	UQ **Quality**
Particular	PS **Substantial**	PQ **Mode**

A substantial universal is also often called a kind or a sort,[88] a quality is called an attribute or a property and even sometimes a universal, and a mode is called a trope or an abstract particular. The Loweian terminologies may create a little confusion with our traditional usage; especially, the word "universal" becomes a little ambiguous. "universal" has a generic sense and by that count both US and UQ are universals (and therefore we use "U" for the both cases). It also has a specific sense, mainly because Lowe often calls a US simply a "universal". I hope this can be easily disambiguated using the relevant contexts. A tip seems to

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Now come some interesting questions. What is then WHITE DOG if it is not a natural kind? Or why can't we have natural kind like WHITE DOG? And along with that come subtler questions. Can we have a trope/mode like "this dogness" or "this white dogness"? These questions are more pointed than they appear. I really have no good answers to them.

[My supervisor has goaded me with this kind of questions; I am very grateful to him for making me see their significance.]

[88] I guess we often, perhaps loosely, use the word "substance" for both US and PS. Such usage may have a detrimental affect in our understanding (especially in teaching). We will soon say that the precise meaning of "substance" is only a special kind of PS.

be worth providing here: a universal in the generic sense is something repeatable, whereas "universal" in the (Loweian) specific sense is something repeatable with some further connotations; in one case it is separable and in another case it is inseparable (in some intuitive sense of separable/inseparable). Historically, the idea of two different types of universals can be traced back to Strawson [1959, p. 168], who called them sortal universals and characterizing universals.

A caution. I have used the words like "substantial" or "substancehood" instead of using the word "substance". I coin the former words, and this is not of course Lowe's terminology, in order to prevent a certain potential confusion, which is this: a substance – in the proper sense – is *solely* what I have marked as substantial or PS. A substance, of course, is a substantial, thus it falls in the PS quadrant of the ontological square. But there might be substantials which are not substances. We may view a substantial as some kind of prerequisite of a substance proper.

What is a substance? We will soon see a semi-formal definition of it, proposed by Lowe. Such a definition is – more or less – a part of a theory trying to capture a very strong intuition about substances. The intuition itself is more important than what we try to capture by a definition of substances. This becomes more pertinent with respect to Lowe; for he – as an Aristotelian – is a substance ontologist, thereby "substance" becomes a pivotal notion in his metaphysics. We need, therefore, a good grasp of that intuition through some informal explication. Unfortunately, my impression is, that we cannot informally explicate the intuition with one swoop. Therefore I adopt a strategy of beginning with the following informal theses, which will work as our initial guide.

1) *ontological independence*

> Substances are independent, invariable and persistent, bearing qualities and changes.

2) *base for qualities*

Qualities or properties depend or stand on substances. [89]

3) *unity*

A substance has some sort of unity of its own

4) *richness thesis*

A substance has rich structure having some essential features and some accidental features. [90]

What is the connection between a substance and certain stuff, say water? Stuff is often claimed to be substance. But why and how? This will be explained in the sequel. There seems to be also some other sense associated with stuff. Can we explain those senses? And how can those senses be related with the substance notion? I shall try to extract some answers to these questions from Lowe. But first we need to know more about Lowe's ideas.

Let us proceed with noting some negative aspects – pertaining to substances as well as other related entities. A substance is not a bundle of modes. Nor is a substance a substratum or a bare object. A sort is not a bundle of qualities; nor can we say – as a nominalist would like to say – that a sort is a collection of its instantiating substantials. Again, we shouldn't think that a quality is a collection of modes. The entities from all the four corners are thus irreducible.

Next some positive claims, not quite about substances but about modes. A mode looks like a trope – of trope theory. In trope-theory a particular redness, say the redness of this very rose (when I point out a particular red rose) is called a "trope". But Lowe would rather call it a "mode". This is of course not a mere verbal issue, for the two schools have opposing orientations. In trope theory a familiar object is taken to be built up by tropes – either as a bundle of tropes or as a cluster of tropes rooted at a substratum. What is basic for a trope theory is the idea that tropes and familiar objects can be explained by or even constructed out of tropes. In contrast, Lowe, as an Aristotelian, will view it from the opposite direction. What is basic for Lowe is the notion of substances, which include the familiar concrete objects we encounter. As a substance a familiar object is actually a foundation of the characterizing modes, which are just some *features* or *aspects*[91] abstracted from the substance. But those modes are very much dependent on the substance – for both their existences and as well their identities (we will, soon see more about what we mean by this kind of dependencies).

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[89] I am told that "substance" comes from a Latin origin which means "to stand below". This thesis seems to bear that meaning well. (Thanks to my supervisor for making me aware of this)

[90] The significance of "substance" in the history of Western Philosophy is simply immense. Lowe writes,

> Different philosophers placed emphasis on different strands in the Aristotelian doctrine of substance: Leibniz, for instance, emphasising (in his theory of monads) the theme of the *unity* of the individual substance; Spinoza emphasising the theme of the *ontological independence* of substance; and Locke ... emphasising the role of substance in its relation to *qualities*.
>
> [Lowe, E.J. (1995) p. 71, the omission is mine]

Let us re-visit the Ontological Square. I propose to refine some terminologies. The two instantiations of the ontological square have to be differentiated. So, I suggest to call it a *sortal-instantiation* when a substantial instantiates a sort; and a *fine-instantiation* when a mode instantiates a quality.[92] Moreover, I shall call it a *nomic-characterization* when an attribute characterizes a sort; and a *concrete-characterization* when a mode characterizes a substantial.

At this point, we need to have at least some justification for differentiating a sort from a quality on one hand, and differentiating an instantiation from a characterization on the other hand. Our natural languages seem to be very supportive for differentiating a sort from an adjective quality. A sort corresponds to a sortal noun and as well as a predicative adjective. So along with the noun phrases like "a cow", "the cow", "water" we also have predicative expressions/adjectives [93] like ".... is a cow" and " .... is water". And more importantly those noun phrases can be used in the subject positions of generic statements like "A cow is a mammal" and "Water is useful". In contrast, the counterparts of qualities are usually attributive adjectives, like "red (flower)" and "smart (boy)"; we don't say "cow (animal)" or "water (lake)".[94] And when we get nominal forms like "redness" or "smartness" then those nominals seem to have very abstract appearances compared to "a cow" and "water".

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[91] Lowe (2006 p. 97) writes,

> Particular properties are no more (and no less) than *features* or *aspects* of particular objects, which may indeed be selectively attended to through a mental process of abstraction when we perceive or think of particular objects, but which have no being independently of those objects and which cannot in any sense be regarded as 'constituents' of objects.

[92] Sometimes Lowe, especially in Lowe (2002 K), reserves the word "instantiation" for what we brand as "sortal instantiation" and uses the word "attribution" for our "fine-instantiation".

Why should we distinguish characterization from instantiation? Recall that a mode characterizes a substance. Both the modes and the substance are individuals or particulars but they are not universals (in the generic sense). In other words neither a mode nor a substance is something repeatable, they are rather something unrepeatable and unique in their respective ways. The relationship between two such unrepeatable individuals cannot be then like instantiation – which is a relationship between a repeatable and an unrepeatable. It is then well justified to call the relationship between two individuals as characterization – which must be different from instantiation.[95] If instantiation is a vertical relationship between two unlike entities – where one is repeatable and the other is unrepeatable, then characterization must be some kind of horizontal relationship between two like entities, which either repeat concurrently or don't repeat at all. So parallel to a mode's characterizing a substance we also have a universal's characterizing a sort; the latter relationship is a kind of mirror reflection of the former (relationship).[96]

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[93] Adjectives are often – mainly by the grammarians and the lexiocographers – divided into predicative adjectives and attributive adjectives. "old" is a predictive adjective in "My friend is *old*", but it is attributive in "He is my *old* friend". Many adjectives are almost exclusively either of them. "awake" is taken to be predicative adjective, whereas "red" is attributive (in Oxford English Dictionary). While the lexicographer carves out "awake" as an predicative adjective from "He is awake" I would carve it out in the form of " ... is awake" – suggesting, like Frege – " ... is awake" is a function.

[94] I am writing all these expressions – "red (flower)", "smart (boy)", "cow (animal)" and "water (lake)" – in the form of the functions' being applied over the arguments. Unlike the first two the latter two examples are ill-formed, suggesting that "cow" and "water" are not functional/predicative.

[95] Strawson(1959) seems to have come to the same kind of conclusion. He used the word "attribution" instead of "characterization". Unlike the "characterization", "attribution" is

There are then four different types of ontological relationships, which are fundamental but remain indistinguishable under the cover of our familiar BE-predication. Consider the following sentences associated with different ontological relationships respectively.

sortal-instantiation: *This is a rose* [US-PS relationship]

when using "*This*" I point out a rose

fine-instantiation: *This is red* [UQ-PQ relationship]

when by "*This*" I point out a particular red, say pertaining to a particular rose.

nomic-characterization: *The rose is red* [US-UQ relationship]

when by "*The rose*" I mean a genre or a natural kind

concrete-characterization: *The rose is red* [PS-PQ relationship]

when by "*The rose*" I mean a particular rose, and by "*...is red*" I mean the particular red of that rose.

We note here a grammatical asymmetry between instantiation and characterization. An instantiation is expressed by a copula. Whereas, this is not necessary with characterization. Besides *The rose is red*, we can have instances of nomic-characterization – *The rose smells nice*, and *The Albatross flies high in the sky*. And as for concrete-characterization we can cite examples like *This rose*

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symmetric.

[96] See Lowe (2006 a) p. 93-94

smells rotten, and *The albatross is flying too low*. An instant of nomic-characterization expresses a natural law, a disposition, and thereby a generic statement that eludes an essence of certain kinds. Such a characterization is then stated by a dispositional predication.[97] [98] An instant of concrete-characterization, by contrast, is stated by occurrent predication.[99] The corresponding statement then expresses either a materialization of a law or an accident. The upshot is now that there is a four-shade spectrum of predications. We have vertical predications and as well as horizontal predications and each of these variants go through further bifurcations. In the next section we will discuss another relation, called exemplification, which – though not basic – is another variant of (normal Be-) predication.

It is worth remembering that as an Aristotelian Lowe follows a principle called Immanent Realism, which simply says: there cannot be uninstantiated universals. This means that for a universal, whether it is a sort or a quality, there must be a particular instantiating the very universal. So if it is a sort there must be at least a substantial instantiating the sort and if it is a quality there must be at least a mode instantiating the quality.

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[97] See Lowe (1980)

[98] In English a dispositional predication takes indefinite aspect – being neither progressive nor perfective

[99] Usually an occurrent-predication has progressive aspect in English.

4.2 Ontological Dependencies

Recall the two theses about substances: 1) the ontological independence thesis – saying that substances are independent, invariable and persistent bearing qualities and changes and 2) the base for qualities thesis – saying qualities or properties depend on substances. The two theses are linked by a common notion which we may call dependency. If a substance is said to be independent then it means that in some sense it is not dependent on some other entities. It is also said that qualities are dependent on substances. We need to sharpen what we mean by being dependent now. Lowe suggests two different dependency relations: *identity-dependency* saying *x depends for its identity upon y* and *existence-dependency* saying *x depends for its existence upon y*, where the relata *x* and *y* are any entities. I shall abbreviate these two relations into $x<=y$ and $x<\exists y$ respectively. Often we may express these two relations with slightly different wordings, for example we may say *the identity of x is dependent on the identity of y* for $x<=y$, and the *existence of x is dependent on the existence of y* for $x<\exists y$. Take the example of *the assassination of Caesar*, which is an event, a certain entity. And *Caesar* is an entity too; intuitively it is a substance. Now the event *the assassination of Caesar* cannot exist without *Caesar*'s existing, so we may write *the assassination of Caesar*$<\exists$*Caesar*. Intuitively, it is also evident that *the assassination of Caesar*$<=$*Caesar*. There seems to be then a connection between these two dependency relations. Lowe will argue, as we will soon see, that identity-dependency is more subtle than the existence-dependency. Some more examples might be helpful at this stage. Take a unit set, say $\{x\}$, along with its sole member x ; or take any non-empty set X along with all its members. It seems now that the principle of extensionality has a close bearing with identity dependency: for we can say $\{x\}<=x$,[100] or more generally $X<=$ *the members of X*. Another example is : a mode is said to be dependent – both for its existences and and as well for its identity – upon the very substance it characterizes. This means that if the mode $\boldsymbol{M}$ characterizes the substance $\mathbf{S}$ then we have $\boldsymbol{M}<=\mathbf{S}$ as well as $\boldsymbol{M}<\exists\mathbf{S}$.

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[100] Fine (1994) uses this example too.

Lowe argues that identity-dependency cannot be symmetric. We cannot have $x<=\{x\}$, while we have $\{x\}<=x$, and we cannot have *the members of* $X<=X$ while we already have $X<=$ *the members of* X. Nor can existence-dependency be symmetric; if $\{x\}<\exists x$ we cannot have $x<\exists\{x\}$. Furthermore, we seem to have quite a strong intuition: $\{x\}<=x$ but not $x<=\{x\}$, and $X<=$ *the members of* X but not *the members of* $X<=X$. Lowe, in a more formal stance, sees the two dependency-relationships as anti-symmetric: if x depends on y with respect to identity or existence and y depends on x in the same sense then x and y must be the same entity. This fits well with his more general view, that any explanatory relationships – say in the forms of x *explains* y or y *because* x or x *therefore* y, where x and y are propositions rather than entities – should be anti-symmetric.

Let us return to our earlier claim, that if a mode $\boldsymbol{M}$ characterizes a substance $\mathbf{S}$ then we have $\boldsymbol{M}<=\mathbf{S}$ as well as $\boldsymbol{M}<\exists\mathbf{S}$. If **M** and **S** are distinct this means, according to antisymmetry, neither $\mathbf{S}<=\boldsymbol{M}$ nor $\mathbf{S}<\exists\boldsymbol{M}$. This is quite understandable if **M** is an accidental mode. Surely Socrates' having a snub nose is dependent upon – whether the dependency is with respect to identity or existence – Socrates, but Socrates is not dependent upon – in either sense – his having a snub nose; for Socrates *could* exist and be identified even he didn't have a snub nose. But the problem starts when **M** becomes an essential mode of **S**, which means that **S** couldn't be without **M** – hence, we would at least have $\mathbf{S}<\exists\boldsymbol{M}$. By anti-symmetry we, then, have to conclude that **S** and **M** are the same – a substance and its essential mode are the same. Later I shall return to this issue having clarified other matters.

So far, each of the dependency relationships has been between two entities; we may call them *specific* dependency relationships. But there can be *generic* dependency: when, say, either the identity or the existence of a particular entity depends on the identity/identities or the existence(s) of some – at least one – entities of certain group, though not on any specific entity of that group. A very good example is what immanent realism demands: that a universal exists if it is instantiated by some particulars, but it doesn't depend on certain specific particulars – for it would exist if there were different particulars besides those specific particulars. Thus if $\mathcal{U}$ is a universal, be it a kind or a quality, and P_i (where *i* is an index) are particulars then the existence of $\mathcal{U}$ is generically dependent on the existences of all those P_i, but U doesn't – of course – depend for its existence on any particular/specific P_i. We may express this by writing $\mathcal{U}<\exists{:}P_i$, where the colon is intended to indicate genericity of the dependency in question. It is important to note that while a universal is generically dependent for its existence upon the existences of the instantiating particulars, its identity is not dependent, whether specifically or generically, upon the identities of those particulars. There seems to be some intuitive ground to accept that, but spelling it more clearly seems to me not an easy task, and – I should add – Lowe doesn't make it very clear.[101]

We may find dependency relationships, according to Lowe, even between the two kinds of universals. A quality, Lowe claims, generically depends for its existence – though not for its identity upon the kind it characterizes. And, both for its existence and as well as its identity a kind is said to depend upon at least some non-substantial universals – which are called its essential properties. Before turning somewhat critical let us list the various dependency relationships Lowe likes to use:

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[101] For example Lowe says, "*a universal is not dependent for its identity upon its particular instances*: the very same universals could have had different particular instances from those it actually has" [Lowe (2006 a) p.62, I add the emphasis]. But that is not a good argument, for by the same token we could argue that *the universal is not dependent for its existence upon its instances*; which is quite contrary to immanent realism .

I. i) A mode is dependent for its existence on the substance it characterizes

ii) A mode is dependent for its identity on the substance it characterizes

But,

iii) A substance is not dependent for its existence on a characterizing mode – provided that the mode is not an essential one.

iv) A substance is not dependent for its identity on a characterizing mode

II. i) A universal is generically dependent for its existence on the particulars instantiating it

ii) A universal is not dependent for its identity upon its particular instances.

III. i) A quality depends for its existence but not for its identity upon the kinds it characterizes

ii) A substantial universal depends for its existence and for its identity upon at least some non-substantial universals, its essential properties [102]

Let us focus on what is said in II: though a universal U is generically dependent for its existence upon its particulars P_i it does not depend for its identity upon P_i. In other words $U<\exists:P_i$ but $\neg U<=:P_i$. This means – that the two dependencies are not co-extensional, and identity-dependency is more subtle than existential dependency. An example is the dependency relation between the substance *Socrates* and its mode *Socrates' humanity* – assuming such mode exists. Clearly *Socrates' humanity* $<\exists$ *Socrates*. Now, if *Socrates' humanity* turns out to be an essential mode characterizing Socrates then we have argued that

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[102] All these are mainly from (Lowe (2006 a p.62).

Socrates <∃ Socrates' humanity. By anti-symmetry this means that Socrates = Socrates' humanity. This argument will not work – it is supposed – with regard to identity dependency. This means that it is not the case that *¬Socrates <= Socrates' humanity,* even if Socrates' humanity is an essential mode. The upshot is now that when Socrates' humanity is an essential mode of the substance Socrates then we have *Socrates <∃ Socrates' humanity* but it is not necessary that *Socrates <= Socrates' humanity.* But that sounds a little puzzling. Why do we have

Socrates <∃ Socrates' humanity

but

¬ Socrates <= Socrates' humanity,

when Socrates humanity is an essential mode? Lowe's answer seems to be that it is due to the definition of a mode's being essential to the substance's possessing the very mode. M is an essential mode of S if S cannot exist without M or S ceases to exist by loosing M, but of course it doesn't say that S looses its identity by loosing M. We seem to have some intuition supporting it : that the identity of S is quite independent from the identity of M. Thus there seems to be a symmetry-breaking (to speak in the jargon of physics) between existence-dependency and identity-dependency. A further implication along with this symmetry breaking is : the identity dependency is more stable and thereby more fine-grained than the existence-dependency. This suggests that we may define existence dependency in terms of identity-dependency.

I cannot stop being critical here with regard to the foregoing discussion. Take a substance S and an essential mode M characterizing the substance. Each of these entities is dependent for its existence on the existence of the other entity. By anti-symmetry this means that they are the same entity. But in terms of identity dependency, suppose they are distinct. This boils down to saying that – though the two entities are *existentially* the same they are distinct in some non-existential sense. Doesn't this mean that there are two senses of identity, one in the sense of being the same existence or being the same entity, and the other in a very thin sense of just being the same? I must admit that I don't understand what this would be. Moreover it seems to be quite inconsistent even from Lowe's own position. For Lowe strongly upholds that there is only one sense of identity.[103] Note we cannot just say here that the distinction between the two entities is just a "distinction of reason" (which is a phrase Lowe [1994 p. 36, 1998 p.142] might have borrowed from Francisco Suarez). For the question is why the distinction works in one dependency but fails in the other. If "distinction of reason" works with one dependency then it should work equally in the other dependency. Furthermore, I think, such an implication violates Leibniz's law – though for Lowe that is not obvious [see Lowe 2002 S p. 143]. If M is an essential mode of S then in a way they are distinct – be that a matter of " a distinction of reason".

Let us see now how Lowe connects the two dependencies in order to define a substance. First the identity-dependency but not the existence-dependency must be primitive. This can be formalized by the following definition.

(D1**) $x<\exists y =_{df}$ Necessarily $x<=y$

A substance is then defined by the identity dependency as shown in the following theorem,

(T7) x is a substance if and only if

(i) x is a particular,

&

(ii) there is no particular y distinct from x so that $x<=y$[104]

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[103] See Chapter 4, "The Absoluteness of Identity: A Defence" of Lowe, E.J. (1989b):

[104] I closely follow here Lowe in saying that (D1**) is a definition and (T7) is a theorem; even the levels themselves – "(D1**)" and "T(7)" – are from Lowe. Lowe is only trying to *sketch* a formal – or better a semi-formal – explication of what a substance is. We should not take his

Note that (T7) does not suggest that a substance has to be just independent. We cannot just say that a substance is not dependent on any other entities. For there seem to be entities which are substances – in some intuitive sense – but yet those very substances depend upon some non-substances. Thus though *Socrates* appears to be a substance, yet it depends upon some non-substances like *Socrates' humanity* or *Socrates' life*. Here the dependency is actually – as Lowe sharpens it – existence dependency. *Socrates* $<\exists$ *Socrates' life* because *Socrates* cannot exist without *Socrates' life*. But this is not supposed to be the case with identity dependency; *Socrates' life* rather depends for its identity upon *Socrates*, but not the other way round.

Let us focus on (T7)(i), which says that a substance should be a particular. This means that a substance has to instantiate a universal, which might be either a substantial universal or a quality. But the substance, if we like to fit it with what Lowe has said so far, must instantiate a substantial universal but not a quality or a non-substantial universal. For if a substance instantiated a quality then that means the substance would be a mode, hence dependent on a substance – perhaps upon another distinct substance – that it characterizes. Therefore, a substance is – by (T7)(ii) – a particular instantiating a substantial universal. This argument may sound question-begging – due to the fact that we have already assumed that a mode is dependent upon a substance. But let us not forget that all these are semi-formal efforts to capture our intuitions about substance.

I have some doubts about the success of Lowe's endeavor. Take the examples of holes. We have very strong intuition that a hole is not a substance, mainly because it has no independent status as is expected from a substance. We may somehow – though not very satisfactorily – fit a hole in the ontological square by treating it as substantial. Surely, the hole sortally instantiates the sort HOLE and it may possess some modes (for example, this very curvy wall of the

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explication to be a formal ontology, though following his suggestions one – but not I at present – may develop a formal substance-ontology.

hole). But, how about its nomic-characterizations? I think we can find examples showing such nomic-characterizations. We do have primitive laws like – "You can't fit a square peg in a round hole" or "If there is a hole in a riverbank then small animals will nest in it."[105] I think a hole is dependent for its existence upon the existence of its host, the thing in which it is a hole. However, the hole is – it seems to me – *not* dependent for its identity upon the identity of its host – for the simple reason: the host may have multiple holes each of which has its *own* identity. Thus we see that a hole is not dependent for its identity upon its host and moreover it is also a particular for instantiating the universal HOLE. In terms of (T7) a hole must be then a substance. But this conclusion is quite counter-intuitive.[106]

It is noted in III that Lowe also brings dependency relationships between the two kinds of universals. For example (in III i)), a quality is said to be generically dependent for its existence though not for its identity upon the kind it characterizes. This is not very convincing; the only justification Lowe can have for claiming this is just to add some nicety to the ontological square.

Despite all these shortfalls I don't want to suggest that Lowe is totally wrong. But I suspect that the metaphysics he likes to uphold cannot be as simple as he sketches.

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[105] Thanks to my supervisor for showing me these examples.

[106] I came across the idea that a hole is being in Casati, Roberto (1999). Originally the idea must have developed in **Holes and Other Superficiality** – Roberta Casati and Achille C. Varzi, A Bradford book, The MIT Press, 1994. I have not gone into the the latter book.

4.3 Identity and Counting

The question is now, What is a stuff – like water and gold – for Lowe then? (This question, as we will soon see, is not precise). One quick answer, which we get from Lowe, is that a stuff is a kind or a substantial universal. If water is a kind or a substantial universal then what are the substances instantiating the very kind? The answer is then that all the various portions are substances instantiating the very kind. Now Lowe has some reasons for this kind of answer. First, there are identity criteria enabling us to decide whether two portions of stuff, say at different temporal indexes, are identical or not; and such criteria can only ensue from a kind or a sort.[107] Secondly, such a solution satisfies both immanent realism and the avoidance of bare particulars. Otherwise we might have an uninstantiated kind water as well as portions of water as bare particulars. Third, "the crucial distinguishing feature of natural kinds", for Lowe, "is that they are subject to *natural law*"[Lowe (1989b): p.5]. And Lowe takes, as we have seen earlier, statements like "Water is a liquid", "Gold is a metal" and "Water dissolves salt" as stating natural laws.

Unfortunately, in asking the question "What is a stuff?" we seem to have slipped over an ambiguity, and the subsequent answer becomes a little question begging, though, not completely useless. There are at least two meanings of stuff, say "water". We have a generic meaning of water, and assuming that water is a substantial universal the foregoing answer has just explained how far we can justify that meaning. In this sense "water" appears to be a countable entity, since in saying "water is a liquid" – which Lowe takes to be a nomic statement involving the kind water – we somehow treat water as a single kind among other similar kinds. But "water" has another meaning when we say "There is some water in the glass" with an unstressed "some".[108] This is more or less related with our treating "water" as something uncountable. Clearly we cannot say "There is

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[107] Lowe, E.J. (1989b) p.10

[108] Cartwright (1970)

one water in the glass", nor can we say "There are *many* waters in the glass", though we can say "There is half a glass of water". In other words we cannot count this "some water", and we cannot do that because there is no principled way of dividing or individuating that "some water" into natural units. What I have so far alluded to by using "some water" can be called "a quantity of water" or "a water portion".[109] Evidently, a quantity of water is something uncountable (despite the fact I have to use the indefinite article "a" with "portion"). Lowe (1998) claims, and I don't want to dispute that at present, that this uncountable feature is something inherent in nature. Interestingly, though a quantity of water is said to be uncountable (because, in Quine's language, it has no *dividing reference*) it seems to have – in some intuitive sense – an identity of its own. For, evidently we can say "This very water in this glass was in that glass yesterday". I can imagine, for instance, that this portion of ash retains its identity despite my scattering it all over the Ganges. Thus, there seems to have some good reasons if Lowe claims that a portion of stuff has determinate identity condition but lacks any determinate condition for counting or individuation.

If a quantity of stuff is said to have determinate identity condition but lacks a determinate condition for counting, then that seems to be an indication that identity and counting are relatively independent. Can there be a reverse situation: lacking determinate identity conditions but having determinate conditions for counting? Lowe (1998) cites an example from Quantum Mechanics when there are two electrons which are in principle indistinguishable. Abstractly, this is a case when there are two items *a* and *b* but there is no determinate truth condition so that we can tell whether *a* and *b* are distinct or identical. As I don't know quantum mechanics I shall not dare to verify this specific example. But I still have some reasons favoring Lowe's demonstration. First of all I accept an epistemic dependency on those who know quantum mechanics; surely it is not unheard of – from these people – that questions of identity or distinction is meaningless with regard to certain kind of elementary particles.[110] Secondly, it seems to be not a necessary truth, let alone an analytic one, that "if some items are determinately countable then these items must have determinate identity conditions". Third, I take the general thrust of Lowe's argument is saying: counting and determining identity/distinction can go quite independently from each other. We can count some items without knowing in principle whether they are distinct, and conversely, we can know some items are distinct without knowing in principle how many they are. If such epistemic situation is possible then it is not difficult for me to imagine that this might be simply because of the very nature of the relevant reality. And lastly, I like to take that by citing all these examples Lowe is calling for a distinction between identity and countability. Maybe we need to have a paradigm shift. Let us not assume that if there are *n* number of items then there should be *n* number of distinct items; just like – we shouldn't assume that everywhere there are four directions, North, South, East and West; nor should we assume that velocity has to be additive a la Newton/Galileo.[111]

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[109] In place of my coinage "portion" Lowe (1998) preferred to use "part" (of water), and Cartwright(1970) Cook(1975) used "quantity" (of water).

So far we have seen that there are items – like electrons in certain situations – *lacking determinate identity conditions but having determinate counting conditions*, and there are items – like quantities of certain stuff – *having determinate identity conditions but lacking determinate counting conditions*. The former items are – in Lowe's terminology – *quasi-objects*, and the latter items are *quasi-individuals*. We may see them as two different symmetric deviations from a standard case of objects – that may be called *individual objects* – which have *both determinate identity conditions and determinate counting conditions.* We may wonder now whether there are items lacking both of these determinate conditions. Lowe has an example for that too. For example a mode has neither determinate identity conditions nor determinate counting conditions. Thus, in Lowe's language, modes are *non-objects*. Note that by coining the terms "quasi-objects" and "quasi-individuals" Lowe stipulates a distinction between an object and an individual, objects come with determinate countable conditions whereas individuals come with determinate identity conditions. Normally, we have both individuals and objects together – hence individual-objects, but in contrast modes are neither objects nor individuals. So, we get now another set of four categories of entities criss-crossing – what we may call – *objecthood* and *individualness*, or – speaking loosely – *form* and *matter*. The following table illustrates the resulting classification.

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[110] I think – from my very poor knowledge on physics – that these particles are usually Bosons.

[111] There may be very ordinary examples where we can count but we cannot trace identity – or at least it is very difficult to do so – through time. Suppose there are four shadows of a ice hockey player at certain spot A of a stadium. At another spot B the player may cast same number of shadows but it seems to be very difficult to determine the identity/distinction between the shadow S_A at spot A and the shadow S_B at spot B. Maybe we can trace the identity/distinction between S_A and S_B by observing the trajectories/routes of the player's movement. But which routes? The problem is that there are many possible routes from A to B or from B to A, and not all the routes are very *well behaved* in showing four shadows *continuously*, and depending on the lighting there maybe no well behaved routes at all. If there are well-behaved routes then it is an interesting empirical question, whether the identity/distinction between S_A and S_B is *invariable* across all the well-behaved routes, or whether there are well behaved routes say R_1 and R_2 so that $S_A = S_B$ through R_1 but $S_A \neq S_B$ through R_2. (I am grateful to my supervisor for prompting me to this line of thinking).

Table 2:

	MATTER/ individualness →		
FORM/ objecthood ↓		*determinate identity*	*indeterminate identity*
	determinate countability	**individual object** *man*	**quasi-object** *electron*
	indeterminate countability	**quasi-individual** *stuff portion*	**non-object** *mode*

We have now two quartets, two classifications. Previously, we have seen a classification in terms of what instantiates what, and what characterizes what. And lately, we see a classification in terms of whether entities are determinately countable and whether they have determinate identity-conditions. I shall keep on calling the previous classification the ontological square, and I shall call the latest the count/identity classification. Most substantials will be classified as an individual object as they have determinate identity conditions and as well as determinate countability conditions. But there are non-standard substantials lacking either determinate countability or determinate identity. For example an electron, on Lowe's account, is a substantial with no determinate identity condition.[112] We can fit an electron into the ontological square, as it instantiates the kind ELECTRON, which in turn are characterized by some nomic law, and last of all the electron may have its own mode – say its very negative charge. Another kind of non-standard substantial is a quantity of a stuff – which is said to have no determinate countability conditions. We will soon see that a portion of water is not a substance either.

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[112] An electron is a substance because Lowe cites the example of a nomic-characterization, saying – 'Electrons have unit negative charge'. See p. 192 of Lowe, E, J (2002 K).

That a quantity of water is not a substance can be argued as follows. Intuitively, the quantity's existence is dependent on the existence of another particular which, we may call a host particular containing the quantity. Thus we may argue that the water in this glass is dependent upon the glass. But this kind argument will not match with Lowe's proposed definition of existence-dependency, which, let us remember, is defined to be an identity-dependency out of necessity, i.e. $x<\exists y =_{\mathrm{df}}$ Necessarily $x<\!=y$. We may rather argue that the quantity is not dependent for its identity upon the identity of its host; for example the water of a river changes constantly whereas the river remains relatively stable. However, Lowe has a better argument for a quantity's being not a substance. A quantity is dependent for its identity on the parts of the quantity. If we just change or replace a part of a quantity then the resulting quantity is no longer identical with the original quantity.[113] In other words, a quantity's identity is extensional, since its identity is dependent upon the identity of its parts.

Now mass concepts like WATER or GOLD are said to be sortal concepts or substantial universals. These substantial universals – let me call them just *mass concepts* – are sortally instantiated by various quantities of corresponding stuff. These quantities are not substances but substantials. So, mass concepts are substantial universals which are instantiated by non-standard substantials – or more specifically by quasi-individuals – which has no determinate condition for counting or identification. There are also other kinds of substantials – like ELECTRON – which are instantiated by non-standard substantials, specifically by quasi-objects, which have no determinate identity-condition. Note there is no substantial universal corresponding to a mode, which is a non-object as it lacks determinate identity as well as determinate countability. This of course follows from the very definition of a mode, which is said to instantiate a non-substantiate universal, an attribute. We may now wonder what justifies us in saying that ELECTRON and WATER are substantial-universals rather than being non-substantial universals. Because, we may answer following Lowe, there are natural laws involving these universals, and "in a natural language [these] laws are most naturally expressed as dispositional predications ... [taking these universals as] sortal terms in subject positions".[114] Let us remember that what we have called sortal terms are just substantial universals. We see now that often sorts or substantial universals can outshine substances (in the sense of playing active role in justifications). So it is not exactly substances but rather substantial universals along with substantials on which we should build our ontology.

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[113] Lowe, E.J. (2002 S) p. 161

At this point a little detour to Aristotle becomes unavoidable. This is, of course, with regard to Lowe's four-category ontology, which is claimed to be based on Aristotle's *Categories*. Roughly the ontology is based on this idea: our familiar concrete things are substances – so all the properties are borne by them. These substances – as Lowe explicates it – sortally-instantiate substantial universals; also they host various modes which finely-instantiate non-substantial universals. But Aristotle has much more to tell us in his later works, especially in his *Metaphysics*. Is the ontology of his later works different from that of his earlier work, *Categories*, or is it a continuation? This seems to be either a debatable issue or a challenging problem for the scholars. There are also other relevant issues taking off from the gamut of Aristotle's works. Admittedly, Lowe doesn't want to join in these scholarly debates. Nevertheless, he tries to assimilate certain issues from *Metaphysics* into his four-category ontology. Unlike *Categories*, *Metaphysics* treats a familiar concrete object as an inseparable combination of matter and form. This view is known as *hylomorphism*. It seems that while expounding hylomorphism Aristotle raises some further problems; one such a problem is, the problem of *individuation*. In Lowe's words,

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[114] The omission and the insertions are mine. The original sentence is "We are now better placed to evaluate my claim that in a natural language natural laws are most naturally expressed as dispositional predication with sortal terms in subject positions." [p. 254 Lowe, E.J. (1980)]

> Individuation ... is an ontological relationship between entities: what 'individuates' an object, in this sense, is whatever it is that makes it the single object that it is – whatever it is that makes it *one* object, distinct from others, and the very object that it is as opposed to any other thing.[115]

A simple but better formulation is this

> ...what 'individuates' an object, in this sense, is whatever it is that makes it the single object that it is – whatever it is that makes it one object, distinct from others, and the very object that it is as opposed to any other thing.[116]

If A individuates B then, let us say, A is the source of or ground for the individuation of B. Or we may simply say that A is the individuator of B. We need a further clarification. Suppose A individuates B. B, according to the above quotes, then makes A the single object that A is. That means A has to be *a single object*. But that must be an unnecessary complication; we should take the expression "a single object" as alluding to any entity or entities. We should treat A in similar manner too. Now I can see a connection between individuation and identity dependency: if A is the individuator of B then B is dependent for its identity upon A. Of course the reverse seems to be not true. There might be cases when A is not the individuator of B though B is dependent for its identity upon A. For, though B is dependent for its identity upon A the latter *may not* make it "the single object that it is". In future I shall call this the *individuation implies identity-dependency thesis*[117], which says, let me repeat : if A is the individuator of B then

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[115] Lowe, E. J. : (2003), p. 75 (the omission is mine)

[116] Lowe, E. J. : (2003), p. 73

[117] One may object now that this thesis is going to weaken Lowe's claim that individuation and identity-determination are mutually independent. But the objection lies on an ambiguity of "individuation". The notion of "individuation" that Lowe contrasted with identity-determination is

B is dependent for its identity upon A.

Now the traditional view is that matter is the source of individuation of an ordinary object. Lowe cannot accept this view. The reason is that this view would eventually lead us to the notion of *prime matter*, which in turn is (almost) indistinguishable from the notion of a *substratum*. A substratum is something which itself has or possesses no properties but yet supports or binds all the properties. We may call it *a substance in itself* – something abstract, bloodless, near to nothing. This notion comes from *Metaphysics*. In contrast, what comes from *Categories* may be called *a substance itself* – which is very mundane, rich and lush with qualities. We don't say that a substance itself just supports some qualities, rather it *has* or *possesses* those qualities. As I have remarked, the notion of matter-cum-substrata is not acceptable for Lowe. For one thing, the notion itself is self-contradictory. Is not having-no-properties a property too? Let's not forget that Lowe loathes bare objects and a substance in itself is just a version of bare objects.

What Lowe favors is a view saying that it is the form which somehow provides the principle of individuation of a given substance (though we shall soon see that by 'form' Lowe has something else in his mind). The point is that a substance, which is a hylomorphic combination of form and matter, can remain identical despite its loosing or gaining matter. This is very much true if the substance is a biological being. In fact we can think of two substances that have completely interchanged their matter over a period of time and yet they retain their identity and their distinctness.

But there is a little danger in saying that it is just a form in which individuation is grounded. Take the example of MAN, which is readily transcribed as a substantial universal in terms of four-category ontology. If we like to see a man – that which instantiates MAN – as a hylomorphic entity (having matter and

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actually related with counting, whereas in the present case "individuation" is closely related with identity-determination. Perhaps I should have adopted a different vocabulary in exposing Lowe's I&S classification.

form inseparably integrated), then we may think of a form, say ManForm corresponding to MAN. Now ManForm is said to be an individuator of a (substance that instantiates the substantial universal) man. At the same time ManForm must fall under one of the four ontological categories. Where can we put it in the ontological square? Being an individuator it cannot be a universal, which is a repeatable entity. How can a repeatable entity individuate a non-repeatable substance? So ManForm is neither a substantial universal nor a non-substantial universal. Nor can it be a mode. For a mode is individuated by the very substance possessing it. We may argue now that a substance and its mode individuate each other. But that would lead us into a vicious circle. Individuation cannot be symmetric.[118] This is quite evident by our intuition. But we have more reasons. Suppose individuation is symmetric: A individuates B and B individuates A. By the *individuation implies identity-dependency thesis* (which we discussed a little while ago) this means that B<=A as well as A<=B. This means that identity-dependency is symmetric. But that cannot be true. Therefore, by *reductio*, individuation cannot be symmetric. We are left with one option now, that a substance individuates itself. That seems to be what Lowe is going to tell us using the Aristotelian terminologies: “substantial form” and “form”. So Lowe writes (I shall quote at length),

> If we want to make sense of the distinction between matter and form ... then we do well to *identify* an individual concrete thing with its own particular 'substantial form'. This, then, will enable us to accept *both* Aristotle's view of the *Categories* that individual concrete things are the primary substances *and* the view, sometimes attributed to Aristotle on the basis of what he says in the *Metaphysics*, that particular substantial forms are the primary substances. For, according to my suggestion, these two doctrines exactly coincide.
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> The position we have arrived at implies ... that it is not ... the

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[118] See Lowe (2003) p. 83

> particular shape of the statue which is its 'form', but rather ... the statue's particular *being a statue of such shape* – something which ... I want simply to identify with the statue itself. And, surely, it must be the statue's shape, which is its 'form', if we take it (as I think we must) that a thing's form determines its identity over time. For a statue's merely having that particular shape does not, as such, constrain its identity over time at all, whereas its being a statue of that shape most certainly does, because a statue cannot change its shape (unlike a piece of bronze).[119]

I read this passage as saying that the "substantial form" of a substance is just the substance itself. Lowe uses "form" and "substantial form" equivocally; sometimes the two terms are synonymous, sometimes they are not. When they are synonymous then "form" seems to be used mostly as an abbreviation of "substantial form". When they are not synonymous then a "form" is taken to be a *substantial universal* and a "substantial form" is taken to be a *substance*. In his own language what Lowe claims is just this: that a substance is the ground for both identification and individuation of itself. I am not sure how Lowe's suggestion will be appreciated by the Aristotelian scholars. But my present impression is that by attempting to solve an Aristotelian problem he has made his own ontology either obscure or distorted. The equivocation between "form" and "substantial form" is not mere carelessness, rather it seems to be a problem inherent in Aristotle's writings.

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[119] Lowe (1998 PoM) p 197-198. The omissions are mine. See also Lowe, E.J. (1999 FWM): p. 9

4.4 More thoughts

Lowe wants to establish two related claims: (1) "that matter provides neither a principle of individuation nor a criterion of identity for individual concrete things: their form alone provides both",[120] and (2) there can be form without matter.[121] Earlier (to the above cited quote) he wrote:

> If we are to regard the 'form' of the statue as something belonging exclusively to the statue *rather than* to the bronze, we do well, it seems, to identify that form with a particular property which the statue has but the bronze does not. There is such a property, of course: the property of *being a statue of such-and-such a shape*. ... In fact, ... I suggest that what we *should* say is that each individual statue doesn't *have*, but *is*, a particular instance of the universal '(being a) statue of such-and-such a shape'.[122] [123]

I shall go through a little digression in order to develop some symbolism, which may help us explicate all these various passages from Lowe. Assume that X is a usual or a normal substance, i.e. it is a 3-D middle-sized concrete object, and furthermore it is made of some matter μ. For instance X can be an iron ball, which we normally consider to be a countable object, and μ can be the quantity of iron out of which the ball is said to be made of. In Lowe's treatment the very quantity of iron is said to instantiate a substantial universal, IRON. We have now two substantial universals BALL and IRON. Intuitively, the former is countable whereas the latter is mass. Let us put this in more general terminology. We assume that X is made of μ and that involves two sortal instantiations, X sortally instantiates a substantial universal Ψ, and μ sortally instantiates a substantial universal mass Φ. Following Lowe's (1989b) convention we can indicate these two sortal instantiations by writing X/Ψ and μ/Φ respectively. In order to indicate that Φ is a mass concept I will underline Φ. So, $\mu/\underline{\Phi}$ will explicitly say that μ instantiates the mass concept $\underline{\Phi}$. This symbolism can be further extended using the following schemes.

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[120] Lowe (1998 PoM) p. 202

[121] For example electrons, in terms of field-interpretation, are matterless forms. Lowe writes "Suffice it to say that the concept of a matterless individual is perfectly coherent, even if physics does not provide us with uncontentious examples of such items". [Lowe, E.J. (1999 FWM) p.11]

[122] See Lowe (1998 PoM) p 197. The omissions are mine. See also Lowe, E.J. (1999 FWM): p. 8

[123] In Aristotle there might be an intimate connection between a principle of individuation and "substantial form", which – in turn – is no less intimately related with the notion of essence. I shall not try to dig out that connection and thereby refrain from entering into Aristotle exegesis. So, at least for the time being, I like to keep the notion of "form" free from that of "substantial form" as much as possible. Let me take "form" as meaning how various "parts [of a substance] are arranged or organized"[Lowe (1998 PoM) p. 196]. This arrangement (of various parts) can be synchronic (or spatial) as well as diachronic (or temporal).

entanglement

$X/\Psi[\mu/\underline{\Phi}]$ X is a Ψ, μ is $\underline{\Phi}$, and X is made of μ.

constitution

$X/[\mu/]$ X is made of μ

sampling

$X/[/\underline{\Phi}]$ X is made of a quantity (or portion) of $\underline{\Phi}$, or in short X samples $\underline{\Phi}$

generic sampling

$/\Psi[/\underline{\Phi}]$ all Ψs are (generically) made of $\underline{\Phi}$ stuff, or all Ψs (generically) sample $\underline{\Phi}$

generic constitution

$/\Psi[\mu/]$ a Ψ is made of the portion μ

The key point of this extension is the notion of entanglement, which, as the name suggests, brings four terms together: (1) a substance X, (2) a standard substantial universal Ψ, (3) the matter $\mu_{|X|}$ in X, and (4) a mass concept Φ. In order to express the notion I have used the scheme $X/\Psi[\mu/\Phi]$. More explicitly I could write $X/\Psi[\mu_{|X|}/\Phi]$, suffixing $|X|$ as a subscript of μ. By $\mu_{|X|}$ I would like to mean the quantity or the matter in X. I shall frequently suppress the subscript but I expect that the relevant context will provide the necessary clues for determining the appropriate subscript. I assume that X and $\mu_{|X|}$ are distinct but that seems to be not a prerequisite for using the symbolism itself. One can, I believe, use my suggested symbolism without deciding whether X and $\mu_{|X|}$ are distinct or not. From entanglement $X/\Psi[\mu_{|X|}/\Phi]$, we may abstract out other derivative notions: constitution, sampling, generic sampling and generic constitution. It seems that all these notions are involved with some kind of sortal-instantiations and they hardly have any bearing on either fine-instantiations or characterizations. In the derivative schemes we find some empty spaces at the either side of a forward slash. This makes it explicit, that the case at hand is an entanglement, and an empty space corresponds to some missing entity – which might be either a particular or a universal. We may say that "μ/Φ" or more explicitly "$/[\mu/\underline{\mathit{\Phi}}]$" is expressing a mass instantiation. This is of course in the framework of four-category ontology and let us remember that here we consider a mass instantiation as a special case of sortal-instantiation. I shall often use "$[\mu/\underline{\mathit{\Phi}}]$" (shortening "$/[\mu/\underline{\mathit{\Phi}}]$") in order to remind us that the corresponding mass instantiation is a part of an entanglement $X/\mathit{\Psi}[\mu_{|X|}/\underline{\mathit{\Phi}}]$.

Here is a specific example. Consider Kohinoor, which is a precious diamond from India and later became a part of the British Crown Jewels. We can write,

entanglement	
$\text{Kohinoor/ADIAMOND}[\mu/\underline{\text{CARBON}}]$[124]	Kohinoor is a diamond made of the carbon quantity μ
constitution	
$\text{Kohinoor/}[\mu/]$	Kohinoor is made of the quantity μ
sampling	
$\text{Kohinoor/}[/\underline{\text{CARBON}}]$	Kohinoor samples carbon
generic sampling	
$\text{/ADIAMOND}[/\underline{\text{CARBON}}]$	Diamonds are (generically) made of carbon, or Diamonds (generically) sample carbon
generic constitution	
$\text{/ADIAMOND}[\mu/]$	There is a diamond made out of the quantity μ [125]

We may now try to explicate Lowe's point using this symbolism. Consider the entanglement $X/\ \Psi[\mu/\ \underline{\Phi}]$. Suppose X is a statue with the form $\mathcal{F}$.[126] If $\mathcal{F}$ is exclusively predicable over X then $\mathcal{F}$ should be somehow integrated with Ψ. This means that Ψ will have certain structure: *being a statue of the form* $\mathcal{F}$, where I have replaced the original '*such-and-such a shape*' by '*the form* $\mathcal{F}$'. I will shorten this alluded structure by writing $\Psi^{(\mathcal{F})}$. So what Lowe suggests boils down to saying this: if X has the form $\mathcal{F}$ then that means the corresponding substantial universal Ψ actually has the structure $\Psi^{(\mathcal{F})}$, and it is not $\underline{\Phi}$ but Ψ or – more precisely – $\Psi^{(\mathcal{F})}$, which can provide us both a principle of individuation and a criterion of identity for X. In other words if X has the form $\mathcal{F}$ then that is because X sortally instantiates a universal Ψ which is also – in some sense – integrated with $\mathcal{F}$. But this (integration) relation between Ψ and $\mathcal{F}$ or the very structure of $\Psi^{(\mathcal{F})}$ looks very mysterious. It seems that Lowe doesn't want to consider that there can be either a non-substantial universal or a mode corresponding to $\mathcal{F}$. In other words $\mathcal{F}$ is neither a non-substantial universal nor a mode. So the relation between Ψ and $\mathcal{F}$ cannot be that of sortal-characterization. But we have strong intuition that $\mathcal{F}$ is a non-substantial universal. Take the adjective "circular" as a value of '*such-and-such a shape*' or '*the form* $\mathcal{F}$'. As an adjective "circular" is quite similar to the adjective "red". Both these adjectives can be used attributively (*a red car*, *a circular box*), and normally – as we have seen earlier – that is how a non-substantive universal is expressed in English. Why can't CIRCULAR be a non-substantial universal like RED then? Why can't there be a "CIRCULAR" mode like a "RED" mode? What Lowe's suggestion implies, that $\mathcal{F}$ is somewhat integrated with $\Psi^{(\mathcal{F})}$ without $\mathcal{F}$'s becoming a non-substantial universal, is quite incomprehensible to me.

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[124] Unfortunately, "diamond" is an ambiguous word. It has matter-sense: diamond is certain matter out of certain carbon allotropes. Also, it has structure-sense: a diamond is a crystal-like structure out of certain carbon allotropes. I write ADIAMOND for the structure-sense.

[125] This notation, let me call it C-notation, has an edge over our usual notation – like F(a), in which we just show a single predication. Recall Laycock's insistence

> it is ... a mistake to speak ... of *things* like *pools* of water as instances of water: for the concept *water* is not such as to have particular instances. A pool of water is not an instance of "water" but of "pool of water"; as an instance of water we might offer the water *in* the pool. [Laycock 1972, p. 13]

Let **a** be a name of certain pool. Then Laycock's worry can be relieved if, using C-notation, we write $\mathbf{a}\text{/POOL-OF-WATER}[\text{the-water-in-the-pool}/\underline{\text{WATER}}]$

[126] To be more specific suppose X is a statue of Ganesh, the elephant god, Ψ is the sortal universal the STATUE OF GANESH, Φ is the stuff bronze, and μ is the bronze of X.

Perhaps Lowe has been inspired by the following passage from Aristotle's *Categories* :

> By being 'present in a subject' I do not mean present as parts are present in a whole, but being incapable of existence apart from the said subject. [127]

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[127] *Categories* (1a 2. 23-25)

Lowe's idea of modes seems to be an interpretation, or at least a partial interpretation, of what Aristotle could mean by *being 'present in a subject'*. A mode is, certainly, "incapable of existence apart from" the subject it characterizes. If our subject is a concrete medium-size three-dimensional substance then intuitively the stuff or the matter out of which the subject is made of can be said to be something 'present in a subject'. But, we cannot just say, as we have said it about a mode, that the matter is "incapable of existence apart from the said subject". For, the very matter *is capable* of existence apart from the original subject, though it needs another subject (to bind with). Suppose X is made of certain matter, say μ. Then there could be or can be different Y – something distinct from X – which could be equally made of μ. Therefore, μ is capable of existence apart from X. Furthermore, one may argue that μ is a part of X. But, according to the above passage, if μ is 'present in a subject' then μ is not a part of X. The upshot is now that a mode but not the matter (μ) can be something 'present in a subject'. A mode is first of all, "incapable of existence apart from" a subject, and secondly, the mode is not like a part of the subject. But we cannot have both these conditions together with regard to the matter, μ.[128]

μ is, according to our foregoing argument, not a mode. A further difference between μ and a mode is that unlike the latter μ can migrate, and that can happen gradually, from one substance to another. If we have to fit μ in the four-category ontology (or something like that) then the best move seems to be what Lowe did: that μ is a substantial or a semi-substance, it must be placed in the left-bottom PS corner of the ontological square, and thereby concomitantly there must be substantial universals like WATER, and GOLD which is sortally instantiated by μ. Note that WATER or GOLD cannot be a non-substantial universal for the particular instantiating a non-substantial particular is mode whereas μ, which is supposed to instantiate WATER or GOLD, is not a mode. The whole move, which

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[128] Lowe (2002 S) argues that μ is not a part of X. But, according to Lowe, Sally Haslanger argues that μ is a part of X.

Lowe opted for, seems to be done in a Procrustean fashion. For in a way μ is quite different from a usual substance say a cat. Parallelly WATER or GOLD, which I shall call stuff concepts, seem to differ from a standard substantial universal like CAT.

The quantity μ is a little different from a full-fledged substance, say, a cat. For one reason μ lacks the ontological independence a normal substance (like a cat) is supposed to have. Recall (T7), which defines a substance on two conditions: first, the substance is a particular, and secondly, as a particular the substance cannot depend for its identity upon other particulars. Well μ can be a particular, since it is supposed to instantiates a universal say WATER. But μ fails to fulfill the second condition as we assume that it has sub-quantities which are particulars and upon which μ depends for its own identity.

As for the difference between a stuff concept and a standard substantial universal consider an entanglement $X/\Psi[\mu/\underline{\Phi}]$, or more specifically the entanglement,

$\text{Kohinoor/ADIAMOND}[\mu_{|\text{Kohinoor}|}/\underline{\text{CARBON}}]$

Now X has certain form, say $\mathcal{F}$ which is typically integrated with Ψ. Now according to Lowe's argument, rather than being a non-substantial universal $\mathcal{F}$ has to be an integral part of Ψ which is actually $\Psi^{\{\mathcal{F}\}}$. Thus $\mathcal{F}$ is somehow determined by Ψ but not by $\underline{\Phi}$. This is of course quite consistent with the popular practice – that Ψ is a sortal concept whereas $\underline{\Phi}$ is not. So a difference between a standard substantial universal Ψ and a stuff concept $\underline{\Phi}$ is visible, provided that there is an entanglement $X/\Psi[\mu/\underline{\Phi}]$ and Ψ is $\Psi^{\{\mathcal{F}\}}$. The difference is simply this: Ψ is $\Psi^{\{\mathcal{F}\}}$ – having the form $\mathcal{F}$ as its integral part, whereas $\underline{\Phi}$ is not integrated with $\mathcal{F}$.

We might be not happy, for having shown the difference between Ψ and $\underline{\Phi}$ on the ground that the former but not the latter is involved with a form. Though $\underline{\Phi}$ lacks the form $\mathcal{F}$ that doesn't mean $\underline{\Phi}$ is formless, provided that $\underline{\Phi}$ is not gunk. If $\underline{\Phi}$ is $\underline{\text{CARBON}}$ then we do have certain reservations about calling $\underline{\text{CARBON}}$ just formless. For in the light of science we know that $\underline{\text{CARBON}}$ is or can be associated with various forms which we call carbon allotropes. So both Ψ, say ADIAMOND and $\underline{\Phi}$, say CARBON are associated or involved with forms. But they differ with respect to their respective involvements. In other words both sorts of universals, the standard universals and mass concepts, are involved with forms but the two involvements, as well as the respective forms, are different. If there is a difference between Ψ and $\underline{\Phi}$, then the difference seems to be most pronounced in the very manner of how each of them are *involved* with the corresponding forms. Parallel to Ψ's involvement with $\mathcal{F}$, $\underline{\Phi}$ is involved with a different kind of forms and in a different manner. Let the form (or the kind of forms) $\underline{\Phi}$ is involved with be $\mathcal{P}$, and I shall show the corresponding involvement of $\underline{\Phi}$ with $\mathcal{P}$ by writing $\underline{\Phi}_{\{\mathcal{P}\}}$. Note the contrast: I show the involvement of Ψ with $\mathcal{F}$ by writing $\Psi^{\{\mathcal{F}\}}$ but I write $\underline{\Phi}_{\{\mathcal{P}\}}$ for $\underline{\Phi}$'s involvement with $\mathcal{P}$. This is to remind us that the corresponding involvements are different. More explicitly the entanglement is formally this: X/ $\Psi^{\{\mathcal{F}\}}[\mu_{|X|}/\underline{\Phi}_{\{\mathcal{P}\}}]$. If the specific entanglement is

$$\text{Kohinoor/ADIAMOND}^{\{\mathcal{F}\}}[\mu_{|\text{Kohinoor}|}/\underline{\text{CARBON}}_{\{\mathcal{P}\}}]$$

then $\mathcal{F}$ will be something saying "*this very crystal like shape with so many faces, edges and vertices; with this and this length ...*" and $\mathcal{P}$ will be saying "*these carbon allotropes, ...*".We may put all these as follows,

$$\text{Kohinoor/ADIAMOND}^{\{\textit{this crystal like shape ...}\}}[\mu_{|\text{Kohinoor}|}/\underline{\text{CARBON}}_{\{\textit{these carbon allotropes ...}\}}]$$

In other words, a particular instantiating a standard universal somehow shows up the corresponding form. In contrast a particular instantiating a stuff concept does not show up the corresponding form rather the particular can be said to be built up from that form. So, instantiating ADIAMOND Kohinoor shows up the concrete form *this crystal like shape ...*. Whereas instantiating CARBON the very quantity (or the matter) of Kohinoor does not *show up* the form *these carbon allotropes ...* of a carbon allotrope, rather the very quantity can be said to be *built up from* or *made* *of these carbon allotropes ... .*

Can we explain or give an account of $[\mu_{|X|}/\underline{\Phi}_{\{\mathcal{P}\}}]$ or $[\mu_{|\text{Kohinoor}|}/\underline{\text{CARBON}}_{\{\mathcal{P}\}}]$? Can we probe further into $[\mu_{|X|}/\underline{\Phi}_{\{\mathcal{P}\}}]$ having armed with a four-category ontology? It seems that we have arrived at some kind of constraints due to our adopted ontological framework. The problem seems to mainly lie here: though in four-category ontology we take the quantity $\mu_{|X|}$ as instantiating $\underline{\text{CARBON}}$, i.e. $\mu_{|\text{Kohinoor}|}/\underline{\text{CARBON}}$ there seems to be no scope for accounting for $\underline{\text{CARBON}}_{\{\mathcal{P}\}}$.

There is a little tension or maybe an internal contradiction in considering that the concept of water (which is stuff) is a substantial universal that can be instantiated by a quantity of water. A substantial universal (which in more traditional accounts is called a "Second Substance") is so called because it is instantiated by a substance, which in turn is supposed to be ontologically independent. But a quantity of water is not ontologically independent (since, as Lowe has shown us, the identity of a quantity is dependent upon the identity of its parts) and hence it is not a substance by that count. Lowe observes that the terms like "water" and "salt" can be pivotal terms in a nomological statement like "Water dissolves salt" just like the terms "cow" and "grass" in "The cow eats grass", which is considered to be a nomological statement too. If "cow" and "grass" can be substantial universals then, Lowe seems to infer implicitly, "water" and "salt" should be substantial too. Consider the following theses or groups of theses.

Group I

a0 A universal has to be instantiated [Immanent realism]

Group II

a1 A substance is ontologically independent [ontological independence]
a2 A substantial universal is (always) instantiated by a substance
a3 A stuff concept is a substantial universal

a4 A stuff concept is instantiated by a quantity

a5 A quantity of stuff is not ontologically independent

Group III

a6 A substance instantiate a substantial universal

a7 A substantial universal plays an important role in causality [causal thesis]

a8 We need modes in causality [causal thesis]

All these theses have been endorsed, either explicitly or implicitly, by Lowe. Along with them we can add the following thesis, which, of course, Lowe never mentioned or was even aware of. (But Laycock, though not very explicitly, seems to have been worried about this).

Group IV

a9 That a quantity's instantiating a mass concept (provided that we are allowed to call it a case of instantiation) is associated with another instantiation involving a substance which (we called it standard normal concept earlier) seems to be ontologically independent [Entanglement]

It is almost evident that all these cannot be true together. This is mainly because Group II is inconsistent since a1+ a2 + a3 implies *what instantiates a stuff concept is ontologically independent* while a4+a5 implies *what instantiates a stuff concept is a quantity – which is not ontologically independent*. A good way to get rid of this inconsistency is to reject a1, the independence thesis about substancehood. If the theses a2 – a8, which are consistent, can make some sense then it seems that they need to be complemented by some causal criteria of substancehood. But that seems to be quite an opposite approach for a substantialist like Lowe. For Lowe's general approach seems to be that causality has to be explained by the notion of substancehood, not the other way round. If we bring a9, the picture of entanglement, then the four-category ontology appears to be a bit straitjacketed approach. For if we say that a water quantity's instantiating water is entangled with a water drop's instantiating the concept water drop, i.e. in notations

`●/WATER_DROP[μ|●|/WATER]`

[where I use the black solid circle as a name of a particular drop of water],

then, what seems to be very natural is that – the two instantiations – `●/WATER_DROP` at one hand, and `μ|●|/WATER` at the other hand – are quite different kinds of instantiations. Remembering (Lowe's) Ontological Square we may say that the first instantiation is a sortal instantiation but the second one is neither a sortal instantiation nor a fine instantiation (involving mode and non-substantial universals). Maybe we can call the latter just a mass instantiation which involves neither a substance nor a substantial universal, and neither a mode nor a substantial universal. Thus mass instantiation will be quite different from both sortal instantiation and fine instantiation, but there is no place for such an instantiation in four-category ontology.

Epilogue

Let us glance back and see what we have done and where the ideas lead on from there. It all started, as I see it in retrospect, from a naïve and vague question: "What is stuff in the Fregean background/framework" – or, perhaps – "Where could stuff fit into Frege's framework" ? This is the beginning of my problem. Later when I tried to sharpen the problem I could rather see that there is an incompatible triad consisting of : the (Fregean) dichotomy, linguisticism, and stuff. By linguisticism, let us recall, I mean a view which says that we can assay an ontology by examining either (i) the structure/syntax of some ideal language (or representational system) or (ii) an invariant structure across (ideal) languages (in the form of some kind of homomorphism among the structures/syntaxes of certain ideal languages or representational systems). And with respect to stuff, as I said earlier, I nurture some a priori intuitions. These intuitions, as we have seen, are not compatible with the other two components, the dichotomy and linguisticism. So what have I found? A brief review seems to be in order.

In Chapter 1 (Ch 1.3) we see that certain intuitions of ours involving stuff don't fit well into our conventional logic, which has become almost an ideal language for philosophers. Besides that, some attempts (in Ch 1.4 and Ch 1.5) were taken to analyze certain aspects of stuff in the light of some of Frege's ideas from *Grundlagen*. Even though they were a little unconventional the attempts were not very successful – we end up either being redundant (in Ch 1.4) or being trivial (in Ch 1.5). Redundant because we hardly achieve anything beyond what our predecessors did, and trivial because the relevant argument is too general to show much.

In Chapter 2 the focus is mainly on the relationship between the dichotomy and stuff: that the triad – the (Fregean) dichotomy, linguisticism, and stuff – is incompatible might be because of the fact that the dyad – the (Fregean) dichotomy and stuff – is incompatible. The source of the latter incompatibility lies in the observation that stuff has a dual nature of being both an object and a concept. Ch 2.2 and Ch 2.3 strengthen this observation with some demonstrations. Now, the dichotomy goes hand in hand with instantiation. If the former is incompatible with stuff so must be the latter. Some other relationship – besides instantiation – must be then called for so that it is suitable for stuff. Let us mark this unknown relationship by REM. REM can be closely tied up with instantiation – which we may mark as INS – or it can be something quite independent. A plausible specification for REM – especially if it is not closely tied up with INS – seems to be the part-whole relationship. Unfortunately, the latter relationship is too ambiguous. Ch 2.6 is a demonstration of such an ambiguity.

In Chapter 3 (Ch 3.1 and Ch 3.2) I ventured to assess a couple of explanations for the dichotomy. The dominant explanation, pioneered by Dummett and Strawson, smacks of linguisticism as all its efforts have been to argue that there is a deep asymmetry in our languages. I counter-argued (and I think I am quite successful in this regard) that such arguments are quite fallacious, and even may be circular. Unfortunately, the other explanation (in Ch 3.2) offered by the non-descriptionist camp fares no better, partly because it has to rely on the unclarified notion of part-whole relationship.

I, however, wouldn't like to jump to the conclusion that the dichotomy is a mere chimera despite the failings of the arguments for it. For we may take it to be a given datum or a kind of axiomatic fact – or better a meta-fact – that the dichotomy is there along with the instantiation relationship. No longer do we need then any justification for it as we take the dichotomy to be too basic to require that. We may now add up a constraint – of immanent realism – that there cannot be an uninstantiated universal. The result is then the Loweian version of Aristotle's metaphysics, the topic of Chapter 4. Being an Aristotelian Lowe, let us bear in mind, is a substance ontologist. He distinguishes two kinds of instantiation, one with respect to substances and the other with respect to modes, which are dependent on substances. I called the former sortal instantiations and the latter fine instantiations. Under sortal instantiations, a substance instantiates a sort or a natural kind. In fact a substance, according to Lowe's "no bare object" principle, should always instantiate one or other natural kinds. And under fine instantiations a mode instantiates an attribute that in turn characterizes a natural kind, and, parallel to this, the mode characterizes the substance instantiating the natural kind. As for stuff Lowe's view is that it is a natural kind, since in that way it can become nomologically significant. What is not very clear in Lowe's account is that if WATER as stuff is a natural kind what will instantiate it? Is it a water body X – such as a river, pond, lake, and so on – or it is the quantity of water in X? If X is a lake instantiating WATER then at the same time X instantiates LAKE too. We will be then burdened to explain how X can be both WATER and LAKE. Such an explanation seems to be not evident in Lowe's account. On the other hand, if X is a quantity then – by Lowe's own account – it will lose its independence and thereby its substancehood – threatening Lowe's whole program on substance ontology.

At the end of the day my main achievement is to have exposed some problems and defects. Our conventional logical apparatus is not quite apt for handling stuff. There seems to be not much hope for stuff in contemporary metaphysics either, as long as the metaphysics is directed by linguisticism – which is strongly affiliated with conventional logic. The hope seems to lie in the metaphysics bequeathed by Aristotle. Unfortunately, the Loweian version of that metaphysics leaves us with despair.

Nevertheless, instead of being too pessimistic I would like to leave here some hints as a direction for further work in future. I think that we may extrapolate an apriori-core notion of stuff by amalgamating certain implicit or underexplored ideas from Aristotle's writings and as well as from other writers. One may consider these ideas as quite essential theses for being stuff. So far I can find three such theses.

First, *stuff has the role of being a carrier/bearer of particularity and as well as of identity*. So – just as a hint for the thesis– it seems to be perfectly sensible to claim that "this portion of water"[129] is distinct from "that portion of water". And, it seems to be due to this thesis, we can talk about migration of matter from one object to another.[130]

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[129] I would like to see here that "quantity" is quite a distinct notion from "portion". But these

Secondly, *stuff has a mathematical aspect involving infinity, continuity, density and so on.*[131] The following passage from Aristotle's Physics [185a33-185b4] seems to be very pertinent to this alluded mathematical aspect.

> Melissus says that Being is infinite. It is then a quantity. For the infinite is in the category of quantity, whereas substance or quality or affection cannot be infinite except through a concomitant attribute, that is, if at the same time they are also quantities. For to define the infinite you must use quantity in your formula, but not substance or quality. If then Being is both substance and quantity, it is two, not one: if only substance, it is not infinite and has no magnitude; for to have that it will have to be a quantity.[132]

This thesis, I believe, has strong bearing with our notion of gunk – that which is infinitely divisible.

Third, *stuff bears a connotation of exhaustiveness*. This notion of exhaustiveness might be demonstrated by contrasting two different types of

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two words are treated as near synonymous by Lowe and other recent writers. In the distinctive sense I would like to see "quantity" as associated with numbers and magnitudes; as such the word should have little bearing with "portion" or "part".

[130] It is worth remembering that Lowe rejects Aristotle's hylomorphism – that form and matter are inseparable. Lowe argues, citing the example of electrons, that there can be forms without matter, and thus he brings a distinction between countability (or countingness) and identity. What I would like to highlight from Lowe's endeavour is that stuff is something for which the identity-question is always sensible, though it may fail to yield a determinate answer to the counting-question.

[131] Thus this aspect has some commonality with Real Mathematical Analysis.

[132] I take all the instances of "quantity" or "quantities" here – as I have mentioned in an earlier note – to be pertaining to the mathematical aspect; it should be distinguished from "portion".

abstractions, or – what I prefer to call – strippings: 1) the stripping $\lambda x.x$ *is (made of) water* and 2) the stripping $\lambda x.x$ *is red*. The difference, I think, between these two strippings is this: with the latter stripping we take away only a particular property but other properties are likely to be left out; whereas with the former stripping, $\lambda x.x$ *is (made of) water,* we cannot avoid stripping other properties – say the property of flowing ($\lambda x.x$ *flows*) and the property of transparency ($\lambda x.x$ *is transparent*). These latter properties seems to be somehow dependent on $\lambda x.x$ *is (made of) water*. Thus the property $\lambda x.x$ *is (made of) water* has a substancelike nature. In a different manner Armstrong [1978b p.66] seems to have struggled with this idea of exhaustiveness too, when he writes,

> If a particular is crimson, and at a certain place and time, it is not thereby determined what particular it is, for there can be plurality of (abstract) particulars at that place and time. But if a thing is gold or is an electron, and is at a certain place and time, the individual involved is fixed.

The idea seems to have struck Quine [1960 p. 92] too, when he writes

> .... things are red, stuff *alone* is water. [133]

I would not claim that simply citing these three theses amounts to giving a metaphysically satisfactory account of stuff. What I would like to suggest that we may take a novel approach starting from some a priori theses.

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[133] The omission and the emphasis are mine.

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***Appendix I*: Notes on Objectivity from *Grundlagen* § 47**

[This appendix complements Ch 1.5]

In section § 47 Frege (1884b) brings this argument:

A sentence about concepts is objective / ∴ A concept is objective [134]

There are further steps in this argument. I shall first give a broad brush outline, then later give a finer outline of the proof. The broad brush outline is as follows

(1) A sentence S which is about concepts is objective

(2) S is (or speaks) about concepts

(2) is true because of

(2′) S doesn't say anything about a particular or definite object because it doesn't designate any object [135]

(2′) is in turn true because of a general principle, which I shall call *the object invoking principle*

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[134] The text [Frege1884b, § 47] begins saying:

> That a statement of number should express something factual independent of our way of regarding things can surprise only those who think a concept is something subjective like an idea. But this is a mistaken view. If, for example, ... we bring the whale under the mammal, we are asserting something objective; but if the concept themselves were subjective, then the subordination of one to the other, being a relation between them would be subjective too, just as a relation between ideas is.
>
> [p. 60]

[135] The text [Frege1884b, § 47] continues,

> It is true that at first sight the proposition
> "All whales are mammals"
> seems to be not about concepts but about animals; but if we ask which animal then we are speaking of, we are unable to point to any one in particular. Even supposing a whale is before us, our proposition still does not state anything about it.
> [p.60]

(2*) "[I]t is impossible to speak of any object without in some way designating or naming it" [136]

We can show the argument in the following order

(1) A sentence S which is about concepts is objective

(2*) "[I]t is impossible to speak of any object without in some way designating or naming it"

(2´) S doesn't say anything about a particular or definite object because it doesn't designate any object

(2) S is (or speaks) about concepts

∴ A concept is objective

Let us make the argument more explicit. Let us rewrite the first premise

(1) A sentence S which is about concepts is objective

I rephrase (2*) as follows

(2**) Whenever we speak of any object we must designate the object.

or in short

speaking about an object ⇒ designating the object

(2´) is actually a conjunction containing the conjunct

(2´a) S doesn't designate an object

Now from (2´a) and (2**) (with the help of *Modus Tollens*) we can derive

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[136] Frege1884b, p.60

(2´c) S doesn't say anything about an object.

Then assuming

(3) Any sentence speaks about either an object or a concept.[137]

Frege infers

(2) S is (or speaks) about concepts

Now comes the hard part. How does Frege go to the conclusion, that a concept is objective? Frege seems to use a principle implicit in the last sentence

> If, then, a concept is something objective, an assertion about a concept can have for its part a factual content. [Frege1884b, p. 61]

I take this as a very pregnant sentence. What does Frege mean by "factual content"? Will it include non-actual objectivity like the Equator or North Sea ? I take "factual content" means simply something objective as Frege discussed earlier [in *Grundlagen* §26]. It is worth remembering that if something is objective then, as claimed in *Grundlagen* §26, it can be actual objective or non-actual objective. So if our given objective is non-actual then an assertion about them should be objective too. A good example is "The North Pole and the South Pole are opposite to each other", where these two poles are non-actual objective. Any higher-order concepts are objective too. The statement "Zero was known by Ancient Egyptians" must be objective even it is false, since it is about a concept (of concepts), Zero. I suspect that there may be a counter-intuitive example but I couldn't find it yet.

The sentence "If, then, a concept is something objective, an assertion about a concept can have for its part a factual content " is founded on a principle which we can state as follows

Upward Principle of Objectivity :

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[137] This is a missing premise, and it is quite consistent with Frege's claim about concept/ object dichotomy.

If anything x is objective and furthermore there is a true statement S about x then S is objective too.

This is parallel to Frege's another assumption that statements relating subjective entities must be subjective too.[138] Interestingly, Frege also has another hidden assumption, which is symmetrically opposite to the Upward Principle of Objectivity.

Downward Principle of Objectivity:

If any statement S is objective and furthermore S is about something x then x is objective too.

In fact this is the principle Frege needs in order to conclude that a concept is objective when a statement about the concept is objective. The other principle, the Upward Principle of Objectivity, is useless here.[139] I mark the Downward

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[138] Frege says,

> [I]f the concepts themselves were subjective, then the subordination of one to the other, being a relation between them, would be subjective too, just as a relation between ideas is [Frege1884b, p. 60]

[139] I have had a little suspicious about the translation, perhaps Austin [Frege, G. (1884b, p. 61):] has missed certain nuance saying,

> If, then, a concept is something objective, an assertion about a concept can have for its part a factual content.

I later rechecked it in Dale Jacquette's translation [Frege, G. (2006), p. 57], which says

> If now the concept is something objective, then an assertion about it can also contain something factual.

Perhaps it should have been translated as " ...(and) only if" sentence instead of an "if ...then.." sentence. But I leave it to the reader (as I lack the required competence) to compare these two translations with the original German [Frege, G. (1884a), p. 61],

> Wenn nun der Begriff etwas Objectives ist, so kann auch eine Aussage von ihm etwas Thatsächliches enhalten.

Principle of Objectivity as (5), which in turns yields (UI5) by Universal instantiation.

(5) If any statement *S* is objective and furthermore *S* is about something *x* then *x* is objective too.

(UI5) If S is objective and furthermore S is about something *x* then *x* is objective too.

In a nutshell the argument then becomes as follows:

(1) A sentence S which is about concepts is objective

(2*) "[I]t is impossible to speak of any object without in some way designating or naming it" [p.60]

(2´) S doesn't say anything about a particular or definite object because it doesn't designate any object

(2) S is (or speaks) about concepts

(UI5) If S is objective and furthermore S is about something *x* then *x* is objective too.

∴ A concept is objective

One may suspect that there may be some circularity in the whole argument. No. For Frege the basic fact is that a statement involving concepts (for example a categorical statement in *Barbara*) are objective. And from this level he goes for upward objectives and as well as downward objectives using his two principles. The notion of objectivity is deeply related with the notion of truth but the former one is a broader notion than the latter. For, as we have seen in the above discussion, a sentence and non-sentence – for example a concept and I should add an object can be objective for Frege. Whereas, the notion of truth is applicable only over a sentence not over a non-sentence. It is also worth mentioning that Frege (1918-19) holds a non-correspondence theory of truth and therefore he needs these principles of objectivity.